

# The Effects of Mindfulness-Based Stress Reduction (MBSR) Program in Iranian HIV/AIDS Patients: A Pilot Study

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**Abstract-** Psychological or behavioral interventions that attenuate the effects of stress may be useful in promoting immunocompetence and delaying HIV disease progression and CD4 count level. Mindfulness-Based Stress Reduction (MBSR) is a behavioral intervention that has as its foundation the practice of insight-oriented (or mindfulness) meditation. In this study, we examined the effects of MBSR upon psychological, physical status and CD4 count of HIV/AIDS infected patients registered at the *Positive Club of Imam Khomeini Hospital* in 2007. Using a pilot study, we evaluated the effectiveness of a psychological intervention (8-week) that was based on training in mindfulness at the Positive Club of Imam Khomeini Hospital in 2007. Eight 2-hour sessions weekly and a day-long retreat were planned for a group of 10 participants with HIV. We investigated the long-term effects of this approach on psychological and physical status of patients by SCL-90-R and MSCL questionnaires and CD4 count after MBSR and in 3, 6, 9 and 12-month follow-ups. We studied six HIV positive patients. The mean age was  $35 \pm 7.7$  yrs. There was no significant difference in MSCL scores after MBSR and in 3, 6, 9 and 12 months compared to those before MBSR ( $P > 0.05$ ). There was a significant difference in SCL-90-R score after MBSR compared with before ( $P = 0.05$ ). Nevertheless, in 3, 6, 9 and 12 months no significant differences were seen in SCL-90-R scores relative to those before MBSR ( $P > 0.05$ ). The means of CD4 count, before and after MBSR, and in 3, 6, 9 and 12 months were  $549 \pm 173.6$ ,  $640.2 \pm 189.4$ ,  $655.3 \pm 183.4$ ,  $638 \pm 167.4$ ,  $619.3 \pm 163.2$ , and  $595.2 \pm 165.6$ , respectively. There was a significant difference in CD4 counts in comparison with those before MBSR ( $P < 0.05$ ). In our study, MBSR had positive effects on psychological status and CD4 count. However, more studies with large sample size are necessary.

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**Key words:** Mindfulness-based stress reduction; HIV; antigens, CD<sub>4</sub>

## Introduction

AIDS is one of the most complex problems of the world and many severe stresses can occur at the time of HIV diagnosis and can continue throughout the disease. Evidence suggests that sociopsychological factors such as stress can lead to the HIV infection progression via viral proliferation and inhibiting immune response.

Mental tensions stimulate the endocrine-neural system and increase the secretion of stress hormones, which in turn, cause changes in the performance of immune system. Hence, those behavioral and psychological interventions that would decrease the stress can play a role

in improving immune system competency as well as delaying HIV progression.

The majority of studies indicate that behavioral interventions have positive effects on character disorders, depression and anxiety. Moreover, these interventions alleviated HIV symptoms. Mindfulness-Based Stress Reduction (MBSR) is a behavioral intervention that is based on self-awareness notion. These skills are brought about by breath concentration in order to recover all living activities.

By changing their perception of distressing events, MBSR helps people and gives them a better control over their life. Mindfulness meditation comprises discipline and real time self-consciousness of everyday life. Both

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dimensions are emphasized during patient trainings in order to attain Stress Reduction (SR) and Relaxation Program (RP).

The body of evidence indicates a positive effect by MBSR on the physical & mental symptoms which promises an effective treatment for those patients suffering from psoriasis, fibromyalgia syndrome, etc (1-6).

MBSR exercises were associated with some physical improvements, namely lowering heartbeat and respiration, lowering blood pressure and fat, decreasing the level of stress hormones, enhancing the performance of immune system, and finally, reducing the hot flushes in women during menopause. Furthermore, it has resulted in smoking cessation and lowering drug usage in addicts.

It has been observed that MBSR improves mood and prevents stress in those suffering from cancer (7-10).

Regarding above, we examined the effects of MBSR upon psychological, physical status and CD4 count of HIV/AIDS infected patients.

## **Patients and Methods**

This pilot study was done as before and after trial on 10 HIV positive patients to examine the effectiveness of MBSR upon psychological, physical status and CD4 count of the patients. The study was conducted at Positive Club of Imam Khomeini Hospital in Tehran, Iran in 2007. Four participants could not complete the course because of more than two sessions of absence; finally 6 patients managed to complete the course. Also, no subjects received antiretroviral therapy. The study protocol was reviewed and approved by the institutional review board of Tehran University of Medical Sciences. All patients gave their informed written consent.

The MBSR was scheduled as an 8-week program with each session lasting for 2 hours, and a set of skills including Body Scan Meditation, Yoga and Sitting Meditation were instructed.

In order to provide all participants with an appreciation of MBSR, first an opening session was held and the method was described in short.

After the opening session, a pre-course interview session was conducted to put aside those who were not qualified to participate in the study. Each individual must meet all of the inclusion criteria to attend the MBSR course, i.e. confirmed HIV positive test by Western Blot and age over 18.

Individuals were excluded if they had a history of major psychiatric disorders such as psychosis and

PTSD, any substance abuse, methadone therapy and/or attitudinal issues. After assessment of eligibility and agreement to participate in the course, one more session was held on the contents of MBSR meetings and the measures undertaken during each session.

Participants' psychological and physical outcomes were assessed using two standardized questionnaires briefly called SCL-90-R and MSCL, respectively.

For the purpose of evaluating MBSR effect on symptoms, these questionnaires had items on psychological & physical symptoms, attitudes, feelings and emotions as well as other queries such as how to cope in distressing situations, opinions, beliefs, in addition to procedure and timing of meditation at home.

These questionnaires had their own scoring systems and lower score denoted decreasing symptoms in patients. The questionnaires were completed prior to treatment, just after the treatment and in 3, 6, 9 and 12 months intervals.

Body Scan Meditation was carried out during the first two sessions with a focus on physical activities like conscious eating and walking.

Sessions 3 and 4 were mainly concerned with training Yoga techniques which in fact are some meetings for self-conscious and self-awareness through looking at body and its internal systems during distressing circumstances.

From session 5 onwards, sitting meditation trainings began, with its emphasis on the stress and methods of dealing with unusual circumstances.

Throughout the final sessions, MBSR experience in everyday life in addition to issues related to stress were considered, focusing on preparing patients for application of these techniques in their daily lives.

A daylong session (between sessions 6 and 7) was arranged following session 6, which lasted for 6-7 hours. During this session, an overall review on the entire trainings was presented. In addition to the sessions, an extensive program of homework was required by all participants in order to fully benefit from the program.

Patients were expected to commit a minimum of 1 hour per day, six days of seven, to practicing the mindfulness-skills taught each week. Patients unable to make this commitment were not admitted at the program. Finally, every participant received the same questionnaires, which they had completed at the beginning of the course in order to compare new information with those obtained prior to program.

**Table 1.** Total MSCL scores, SCL-90-R scores and CD4 Counts of the participants during different times in the project

	MSCL						SCL-90-R						CD4 counts						
	Before MBSR	After MBSR	3 month F/U	6 month F/U	9 month F/U	12 month F/U	Before MBSR	After MBSR	3 month F/U	6 month F/U	9 month F/U	12 month F/U	Before MBSR	After MBSR	3 month F/U	6 month F/U	9 month F/U	12 month F/U	
ID of the patients	1	28	14	21	24	18	22	181	123	158	173	149	149	418	530	513	560	507	471
	2	29	33	26	30	19	20	99	119	107	131	99	99	342	426	440	405	416	393
	3	39	29	29	18	19	19	152	121	121	77	114	114	591	580	631	619	601	570
	4	4	5	5	5	2	2	117	56	56	56	53	53	827	941	952	902	884	860
	5	1	1	3	1	5	5	19	9	0	2	0	0	482	573	630	610	597	582
	6	30	11	37	21	21	21	98	38	111	95	150	150	634	791	766	732	711	695

Then, patients were followed up in the intervals of 3, 6, 9 months and 1 year at the end of which, patients were asked to complete the questionnaires again to evaluate the effectiveness of MBSR program on psychological and physical symptoms of the patients.

Statistical analysis was performed with STATA (8.0) to assess the complete trial. Also, means, standard deviations and proportions were generated. Statistical significance was accepted at a level of  $p \leq 0.05$ .

## Results

In this project, we studied 10 HIV positive patients and 4 patients were excluded because of more than 2 sessions of absence in the course. Finally, the study continued with 6 participants. The mean age was  $35 \pm 7.7$  (3 male, 3 female).

The means of MSCL scores, before and after MBSR, were  $21.8 \pm 15.5$  and  $15.5 \pm 12.9$ , respectively (Table 1). There was no statistically significant differences in MSCL scores compared with those before MBSR training ( $P > 0.05$ ; Table 2). Also, 3, 6, 9 and 12 month MSCL

scores were not significantly different from those obtained before MBSR ( $P > 0.05$ , Table 2).

The means of SCL-90-R, before and after MBSR, were  $111 \pm 55.5$  and  $77.7 \pm 49.8$ , respectively. There was a statistically significant difference in SCL-90-R scores compared to before MBSR ( $P = 0.05$ ; Table 2), but 3, 6, 9 and 12 month SCL-90-R scores were not significantly different from those obtained before MBSR ( $P > 0.05$ ; Table 2).

The means of CD4 count, before and after MBSR, 3, 6, 9 and 12 month were  $549 \pm 173.6$ ,  $640.2 \pm 189.4$ ,  $655.3 \pm 183.4$ ,  $638 \pm 167.4$ ,  $619.3 \pm 163.2$ , and  $595.2 \pm 165.6$ , respectively. Table 1 shows CD4 counts of the patients at different time of the MBSR program.

In our study, before and after the program and also in follow-up periods, there was significant differences in CD4 counts compared to before MBSR ( $P < 0.05$ ). Table 2 shows mean, standard deviation and P value of CD4 counts at different times of MBSR program. Some decreases were recorded in absolute CD4 counts of the patients after 3 month follow up period which were not statistically significant ( $P > 0.05$ ).

**Table 2.** Mean, standard deviation and P value of MSCL, SCL-90-R and CD4 counts at different times in MBSR program

Time in the project	MSCL			SCL-90-R			CD4 counts		
	Mean	Standard Deviation	P	Mean	Standard Deviation	P	Mean	Standard Deviation	P
Before MBSR	21.8	15.5	-	111	55.5	-	549	173.6	-
After MBSR	15.5	12.9	0.16	77.7	49.8	0.05	640.2	189.4	0.01
3 month F/U	20.2	13.6	0.54	92.2	55.7	0.15	655.3	183.4	0.001
6 month F/U	16.5	11.3	0.19	89	59.4	0.23	638	167.4	0.004
9 month F/U	14	8.2	0.07	94.2	58.5	0.35	619.3	163.2	0.004
12 month F/U	14.8	8.9	0.09	94.2	58.5	0.35	595.2	165.6	0.04

## Discussion

Today, man is facing a turbulent life with an ever-increasing pace and it is evident that every single person experiences everyday stresses, especially those suffering from HIV infection who have to endure additional tensions and related limitations. Such difficulties have an adverse effect on the mental health and peace of mind.

However, all individuals have the power, stability and necessary flexibility in order to deal with this sort of situations. MBSR is a method for gaining access to these internal reserves.

AIDS is among the most complex problems, becoming a real threat to the public health in many countries, especially Iran where apart from its financial burden, it causes heavy spiritual-mental pressures on the families and society. An important issue is the stress that aggravates the disorder via increasing risky behaviors and suppressing immune system. Thus, a series of measures have to be taken for these patients in order to limit mental damages by employing their own innate abilities.

In most health care settings, psychosocial interventions targeting stress and distress states that are integrated into routine HIV care will need to serve a large number of patients. Due to their time- and cost- efficiency, group approaches are being used increasingly in medical settings to address this need. One approach that has been used successfully in cancer and other chronic diseases is MBSR, an 8-week manualized treatment program (11-13) that provides mood management techniques based on training in mindfulness, a metacognitive skill (14). A recent randomized controlled trial in cancer demonstrated that this brief intervention significantly reduced anxiety and depression symptoms (7) and that these gains were maintained at a six-month follow-up (15). Similar results have been obtained in a heterogeneous sample of medical patients (16). Although research in this area is in its infancy, it does appear that MBSR may be effective in the management of anxiety and mood symptoms common to various medical conditions and thus may be a good treatment option in HIV positive clients.

Specia et al studied the effects of MBSR on mental disorders and distressing symptoms in outpatients suffering from cancer and observed that following 8-week interventions, patients who received this treatment had a lower score from the total score of mental disorders including depression, anxiety and perplexity.

This suggests a better capacity to cope with problems in comparison to the control group. Moreover, the group

that experienced the intervention had a lower level of stress, cardiopulmonary symptoms, digestive symptoms and irritability. In general, the intervention resulted in 65% and 31% decreases in mental disorders and stress symptoms, respectively (7). Kabat Zinn showed that a 10-week mindfulness meditation on 51 chronic pain patients, who had not improved with traditional medical care, can reduce greater than or equal to 33% in the mean total Pain Rating Index and number of recorded medical symptoms. There were also significant reductions in mood disturbance and psychiatric symptomatology (17). Kaplan et al showed that completing a 10-week meditation based stress reduction program could be really effective in patients with fibromyalgia as the mean scores of all the patients completing the program showed improvement (18).

Roth and colleagues showed that completing an 8-week MBSR program could be effective in health-related quality of life, but did not improve the sleep quality or family harmony items (19).

In a study on affects of MBSR on stress, mindfulness self-efficacy, and positive states of mind done by Vickie Y. Chang and colleagues showed that post-MBSR levels of stress were significantly lower than pre-MBSR levels, while mindfulness self-efficacy and positive states of mind were at significantly higher levels (20).

A randomized case control pilot study done by Pradhan and colleagues showed that an 8-week MBSR course and 4 month maintenance program on patients with rheumatoid arthritis including their usual rheumatologic care, at 2 months, there were no statistically significant differences between groups in any outcomes. At 6 months, there was significant improvement in psychological symptoms. There was a 35% reduction in psychological symptoms among case group (21).

During our study over a period of 8 weeks, we attempted to provide HIV positive patients with required training to reduce their stress using their innate capacity.

In the current study, there was no significant difference in average grades of MSCL, prior and after treatment (Table 2) with 3, 6, 9 and 12 month follow-ups (Table 2).

Taking into consideration the effects of MBSR on physical and mental symptoms, suggested by previous studies, we could arrive to the conclusion that the lack of significant difference is probably due to the small sample size (6 individuals). Therefore, it is necessary to conduct experiments with higher sample sizes.

In case of the average grades obtained from SCL-90-R, the average grades of patients after treatment was

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significantly ( $p=0.05$ ) lower comparing those prior to treatment which conforms to previous studies. However, this difference was not significant in 3, 6, 9 and 12 months follow-ups (Table 2).

A recent study indicated that the improvement of clinical symptoms in patients suffering from chronic pain at most takes 4 years and for patients with stress disorder takes a maximum of 2 years. Moreover, earlier studies suggested that those patients who keep MBSR exercises continuously throughout the time obtained desirable results in general recovery during follow-ups. Hence, it seems necessary to perform MBSR exercises in several intervals in order to preserve its durability (22).

There was a significant increase ( $p<0.05$ ) in CD4 levels at different intervals after the treatment compared to those measured before treatment. Because no patients have received retrovirus medication, it is reasonable to attribute the increase in CD4 numbers to MBSR impact.

The level of CD4 exhibited a significant increase until the month twelve, compared to the time prior to treatment. So it could be concluded that MBSR influences CD4 level at least for one year but, with regard to the CD4 level reduction after 3 months compared to earlier times, it is required to arrange MBSR courses again to sustain its durability.

With respect to the small sample size, it is necessary to conduct studies with higher sample sizes to investigate the effect of MBSR on CD4 level.

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