

Effectiveness of mindfulness-based stress reduction training on resilience in Iranian HIV-positive women: a clinical trial

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Abstract

Introduction: Human immunodeficiency virus (HIV)-positive patients experience various concerns and difficulties, including depression and anxiety, which affect their physical and mental health. Resilience is defined as successful coping with challenging life situations. Higher levels of resilience are associated with improved mental and physical health in chronic diseases.

Material and methods: This randomized clinical trial included one intervention and one control groups, and it was conducted with 90 HIV-positive women presenting to the Behavioral Diseases Counseling Center of a teaching hospital affiliated to Tehran University of Medical Sciences in Tehran, Iran. Patients were randomly assigned into intervention and control groups. Participants in both groups completed a demographic questionnaire as well as Connor-Davidson resilience scale. Women in the intervention group participated in eight 60-minute sessions (one session per week). Connor-Davidson resilience scale was again completed by participants in both groups immediately, and 4 weeks and 8 weeks after the intervention.

Results: There was no significant difference in the total score of resilience and its sub-scales between the two groups before the intervention, whereas right after, the total score of resilience and sub-scales of control and spiritual influences were significantly higher in the intervention group ($p > 0.05$). Repeated measures analysis of variance showed a significant difference in the mean score of resilience scale and sub-scales at four time-point measurements in the intervention group ($p < 0.05$), while no significant difference was observed in the control group ($p > 0.05$).

Conclusions: The findings from the current study suggest that mindfulness-based stress reduction training could improve resilience in female HIV-positive patients.

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Introduction

At the end of 2019, there were an estimated 38 million people living with human immunodeficiency virus (HIV), of these, 19.2 million were HIV-positive women [1]. In Iran, according to statistics published in 2019, there are 59,000 people living with HIV, of which, 16,000 are women over 15 years old [2]. Several studies have shown that people with HIV experience higher psychological distress, such as depression and anxiety, as compared with the general population [3]. Psychological stress may accelerate HIV infection via both physiologic/immune and behavioral pathways, including decreased adherence to treatment [4]. In all ethnic and racial groups, HIV-positive women have to overcome many difficulties and hardships, including poverty, violence, sexual and physical assault, and sexual inequality, especially regarding income, educational opportunities, and professional prospects.

Due to disease complications or stigma, HIV-positive people suffer from mental and social distresses (i.e., depression, anxiety, etc.), and protective buffers, such as resilience, self-efficacy, and social support, might help them to overcome these difficulties [5]. Resilience is a key concept in positive psychology that is related to effective coping and positive adaptation when facing challenges and hardships [6]. Previous studies showed that factors related to resilience included problem-solving skills, communication skills, and sympathy [7]. Resilience is an important issue in HIV-positive people due to their exposure to different stress factors, such as effects of HIV, stigma associated with HIV, mental illness, interpersonal violence, unstable housing, and poverty as well as stressors, which may be more common in women than in men, because they involve child-bearing responsibilities, gender-related stigma, and sex discrimination [8].

Despite significant treatment advances, HIV continues to be a stressful chronic disease for many, and is related with high levels of depression. Stress and depression in HIV are of concern not only because of the harmful effects on quality of life, but because they are co-related with negative sequelae, involving poorer treatment adherence, increased risk, behaviors for HIV transmission, and potentially more rapid disease progression. Positive psychological condition, such as positive affect and optimism, are associated with lower risk of mortality among people with HIV, more useful engagement in care after diagnosis, and greater chance of achieving viral suppression when taking antiretroviral therapy [9].

Efforts to reduce stress in HIV-positive people through cognitive-behavior methods, relaxation techniques, and other stress management interventions, have caused improvements in stress perceiving, cortisol level, and CD4 count. Recently, attention has been given to the effect of mind-body stress management, known as 'mindfulness-based stress reduction' (MBSR) in HIV-positive people. It is an 8-week intensive training in mindfulness meditation, including sitting meditation, body scan, and light yoga. MBSR helps to transform people's relationship with their inner experience of psychological stress, such as reactions to thoughts, body

sensations, difficult emotions, and relationships with others, in order to reduce physiological and behavioral stress reactivity. Convincing arguments have been presented to include mindfulness meditation into treatment programs for people with HIV/AIDS, suggesting that mindfulness meditation is an ideal complement to traditional treatment programs for those patients, considering the broad spectrum of psychological, physical, social-cultural, and economic stress factors in HIV/AIDS patients. Studies have demonstrated that mindfulness training can improve psychological well-being and self-esteem in HIV-positive patients [10]. Despite the vulnerability of HIV-positive individuals, their exposure to challenges, and the importance of reproductive health as one of the research priorities in the world and Iran as well as an increased number of HIV-positive Iranian women of reproductive age [11], no study has investigated the effect of mindfulness-based stress reduction on resilience in Iranian HIV-positive patients. Therefore, this study was conducted to contribute to the topic and provide a framework for possible future interventions.

Material and methods

Design

This randomized clinical trial included one intervention and one control groups, and it was conducted to evaluate the effect of a mindfulness-based stress reduction training on stress resilience in HIV-positive women. The study was approved by the ethics committee of Tehran University of Medical Sciences (IR. TUMS. FNM. REC. 1397. 213 dated March 18, 2019), and registered in the Iranian Registry of Clinical Trials IRCT20120414009463N59 (dated April 29, 2019).

All participants signed an informed consent form, and it was completed by themselves. All subjects were over 18 years.

Participants

The inclusion criteria were age 15-45 years, ability to read and write, diagnosis of HIV for more than 6 months, lack of known physical and mental illnesses according to the patient's record, no participation in educational classes related to mindfulness and stress management, and lack of chronic diseases, chronic psychiatric disorders, and such problems. The exclusion criteria were missing a training session and lack of follow-up. This randomized clinical trial, with one intervention and one control groups, was conducted in a sample of 90 HIV-positive women, who presented to the Behavioral Diseases Consultation Center of a teaching hospital affiliated to Tehran University of Medical Sciences, Tehran, Iran in 2019.

Intervention

The intervention was performed within a group of patients, with group sessions consisted of 9 groups of 5 people, and were held for 60 minutes each week for 8 weeks.

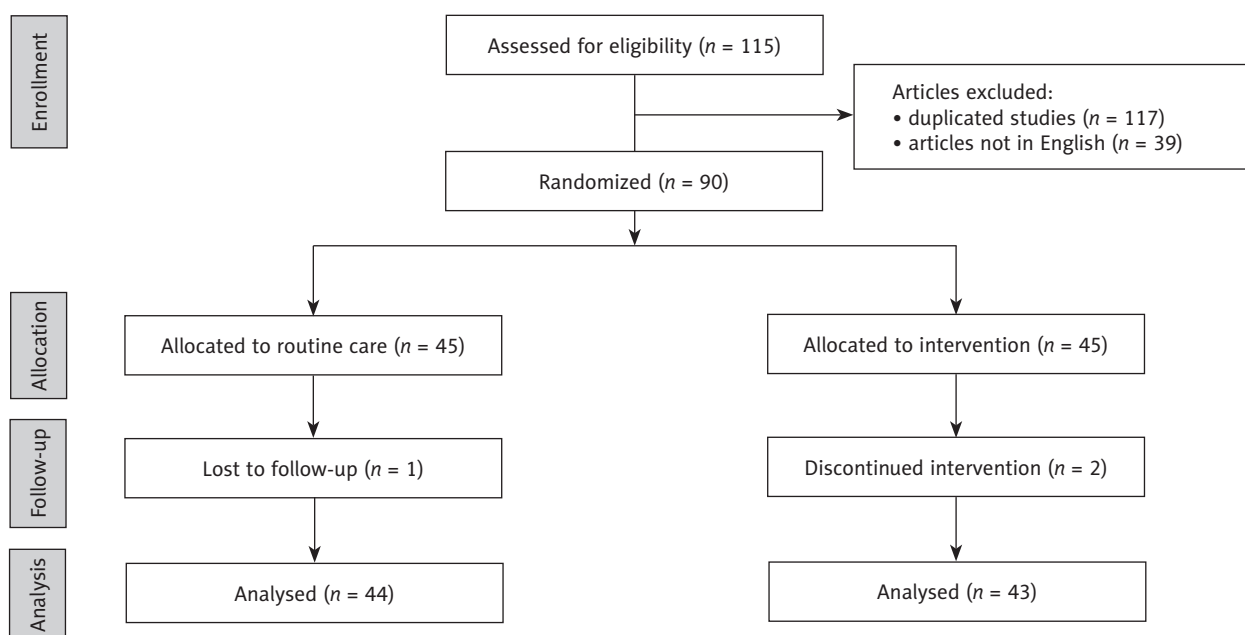


Figure 1. The study flowchart

Then, MBSR was taught to the subjects in the intervention group. MBSR was implemented in a class setting, where sitting meditation gentle mindful hatha yoga, a body scan meditation, and other approaches to cultivate mindfulness in everyday living were introduced [10]. The participants in the control groups received a routine care.

Outcome measures

Connor-Davidson resilience scale (CD-RISC) was applied to collect data on stress resilience [12]. The scale contains 25 items evaluated on a five-point Likert scale, ranging from 0 to 4, where (0) meaning 'not true at all', (1) 'rarely true', (2) 'sometimes true', (3) 'often true', and (4) 'true nearly all of the time'. The scale is based on feelings experiencing during previous month, and the ratings result score ranges from 0 to 100 [11]. The total score of the scale is a sum of individual item scores, with a cut-off point of 50. Scores above 50 suggest resilience, and higher scores indicate higher resilience [13]. The sub-scales of CD-RISC include personal competence, trust in one's instincts and tolerance of negative affect, positive acceptance of change and secure relationships, control, and spiritual influences [14]. Connor and Davidson reported a Cronbach's α coefficient of 0.89 for the scale, and stability coefficient for test-retest analysis at a 4-week interval was 0.87. Psychometric properties of the Iranian version of CD-RISC are well documented [15]. The participants in both groups completed the CD-RISC at four time-points: baseline, immediately after the procedure, 4 weeks, and 8 weeks after the intervention. In addition, a demographic questionnaire, including three sections on personal data, obstetric data, and disease information was administered and completed.

Sample size

The sample size was estimated using the following formula:

$$n = (z_{\alpha/2} + z_{\beta})^2 \times 2 \times \sigma^2 / d^2,$$

where $z_{\alpha/2} = 1.96$, $z_{\beta} = 0.84$, and $\sigma^2 = 0.85$. The required sample for the study was calculated to be 40 per each group [$n = (1.96 + 0.84)^2 \times 2 \times 0.85 / 0.036 \approx 40$] to have 80% power at 5% of significance level. However, with 10% possible drop out, a sample of 45 participants were considered.

Randomization

The participants were randomly assigned into the intervention (A) and control (B) groups, using patients' identification cards. The first patient was assigned to the intervention group, and the next patient was transferred to the control group.

Statistical analysis

SPSS software, version 23 was used for all statistical analysis. Since the data did not have a normal distribution, non-parametric tests were applied. Independent *t*-test was used to compare the total score of CD-RISC and its sub-scales before and after the intervention in each group and between the two groups. *P*-values less than 0.05 were considered significant.

Results

The results showed no significant difference in demographic characteristics between the two groups ($p > 0.05$).

Table 1. Characteristics of study participants

Factor	Intervention (n = 43)	Control (n = 44)	p-value*
Age (years)			
15-25	1	3	0.48
26-35	17	18	
36-45	25	23	
Education level			
Primary	9	3	0.59
Secondary	27	32	
University education	7	9	
Occupation			
Housewife	34	11	0.65
Employed	9	33	
Socio-economic status			
Good	2	1	0.90
Intermediate	26	29	
Poor	15	14	
Disease duration			
< 1 year	7	13	0.21
3-5 years	3	2	
> 5 years	33	29	
Spouse's HIV infection			
Yes	26	27	0.93
No	17	17	
History of sexual abuse			
Yes	7	6	0.73
No	36	38	
History of domestic violence			
Yes	18	16	0.60
No	25	28	

*Derived from χ^2 test

As for education level, the highest frequency percentage was related to high school education (39.5%) in the intervention group, and secondary education (40.9%) in the control group. The longest disease duration was more than 5 years in both the groups (intervention, 76.7%; control, 65.9%). All participants were married, but there was no significant difference between the two groups (Table 1).

The results did not show any significant difference in the total score of CD-RISC and its sub-scales between the two groups before the intervention ($p < 0.05$) (Table 2). Immediately after the intervention, the total score of CD-RISC as well as the scores of sub-scales of control and spiritual influences were significantly higher in the intervention group compared to the control group ($p > 0.05$), while there was no significant difference in other sub-scales between the two groups ($p < 0.05$). The results indicated that the total score of CD-

RISC and all sub-scales were significantly higher in the intervention group compared to the control group at 4 and 8 weeks after the intervention ($p > 0.05$) (Tables 3 and 4).

Discussion

The aim of this study was to evaluate the effectiveness of mindfulness-based stress reduction training on resilience in Iranian HIV-positive women. The results demonstrated that MBSR had encouraging effects on Iranian HIV-positive women's resilience. The total score of CD-RISC and sub-scales of control and spiritual influences were significantly higher in the intervention group compared to the control group immediately after the intervention, while there was no significant difference in scores of other sub-scales between the two groups at this time. At four and eight weeks after the intervention, the total score of CD-RISC and all sub-scales were significantly higher in the intervention group.

The findings of the present study were consistent with results of some previous research. Webb *et al.* were investigated HIV-infected youths, and found that subjects in MBSR group had higher levels of mindfulness, problem-solving coping, life satisfaction, and lower levels of aggression and control over negative emotions at a 3-month follow-up [2]. Xianon *et al.* reported improvements in total score of resilience as well as several resilience-related outcomes, including emotional regulation, self-esteem, hopefulness, and support seeking, which was consistent with our results [16]. In a study by Xianon *et al.*, HIV-positive subjects had higher resilience scores, and reported improvements in problem-solving skills and self-confidence after intervention and during follow-up period [17]. Moreover, Frederick *et al.* found significant improvements in perceived stress and mindfulness in MBSR group in a three months following intervention [9]. Moghadam *et al.* observed significant differences in scores of spiritual and psychological domains as well as in total score of quality of life between three study groups after procedure [18]. A study conducted by Ahmadi *et al.* showed that resilience training had positive effects on mental health of people with drug dependency, which was in line with the findings of the present study [19]. Dehghani *et al.* noticed a significant increase in mean score of quality of life and resilience in post-tests in intervention group, while changes were not significant in control group [20]. Eloff *et al.* conducted a study with HIV-infected mothers and their children with 6-, 12-, and 18-month follow-ups, and observed no significant differences in maternal psychological and parenting measures between case and control groups, while depression improved markedly, but not significantly over time. Evaluations showed that increased attendance had a significant correlation with a decrease in maternal depression and an increase in coping through seeking help from others. Regarding children, externalizing behaviors improved significantly in intervention group, whereas improvement in internalizing behaviors was very small. The results also showed significant improvements in two of adaptive functioning

Table 2. Comparison of CD-RISC and its sub-scales between intervention and control groups before intervention

Sub-scale	Intervention group (n = 43), mean (SD)	Control group (n = 44), mean (SD)	p-value*
Personal competence	16.79 (6.41)	17.48 (5.97)	0.61
Trust in one's instincts, tolerance of negative affect	15.35 (4.55)	15.20 (4.34)	0.88
Positive acceptance of change and secure relationships	10.84 (3.92)	10.86 (3.14)	0.97
Control	6.33 (2.62)	6.02 (2.67)	0.57
Spiritual influences	5.02 (2.01)	5.09 (2.24)	0.88
Total score	54.43 (14.52)	54.66 (12.25)	0.91

*Derived from t-test

Table 3. Comparison of CD-RISC and its sub-scales in intervention group at four time-point measurements

Sub-scale	Before intervention, mean (SD)	Immediately after intervention, mean (SD)	4 weeks follow-up, mean (SD)	8 weeks follow-up, mean (SD)	p-value*
Personal competence	16.79 (6.41)	18.93 (4.95)	20.12 (4.88)	21.09 (4.43)	< 0.001
Trust in one's instincts, tolerance of negative affect	15.35 (4.55)	17.53 (3.66)	18.98 (3.45)	19.91 (4.29)	< 0.001
Positive acceptance of change and secure relationships	10.84 (3.92)	12.49 (3.22)	14 (3.14)	15.02 (3.20)	–
Control	6.33 (2.62)	7.14 (2.33)	7.63 (2.10)	8.21 (2.08)	< 0.001
Spiritual influences	5.02 (2.01)	5.88 (1.45)	6.74 (1.38)	7.33 (1.06)	< 0.001
Total score	54.33 (14.52)	61.89 (10.34)	67.46 (10.04)	75.56 (10.57)	< 0.001

*Derived from repeated measures analysis.

Table 4. Comparison of CD-RISC and its sub-scales in control group at four time-point measurements

Sub-scale	Before intervention, mean (SD)	Immediately after intervention, mean (SD)	4 weeks follow-up, mean (SD)	8 weeks follow-up, mean (SD)	p-value*
Personal competence	17.48 (5.97)	17.52 (5.77)	17.99 (5.93)	18.14 (5.65)	0.15
Trust in one's instincts, tolerance of negative affect	15.20 (4.34)	16.07 (5.01)	16.09 (3.75)	16.00 (3.85)	0.20
Positive acceptance of change and secure relationships	10.86 (3.14)	11.52 (3.22)	11.64 (3.13)	11.58 (2.97)	0.12
Control	6.02 (2.67)	6.09 (2.29)	5.99 (2.28)	5.93 (2.31)	0.33
Spiritual influences	5.09 (2.24)	5.05 (2.14)	5.20 (2.06)	5.34 (1.78)	0.25
Total score	54.66 (12.25)	56.25 (12.42)	56.91 (11.82)	56.99 (11.75)	0.10

*Derived from repeated measures analysis.

domains, i.e., communication and daily living skills, while socialization did not improve significantly [21]. In contrast with the present study, Medhay *et al.* found that mindfulness meditation programs had moderate evidence of enhanced anxiety, depression, and pain as well as low level of improved stress/distress and mental health-related quality of life [22].

All the above studies demonstrated that in addition to medical treatment, treatments based on stress reduction are additionally required for HIV management. This was the first study investigating the effectiveness of MBSR in increasing resilience in Iranian HIV-positive women. The subjects of this study were women of reproductive age, who

comprise a large proportion of the general population, and resilience is an important issue in this group.

A limitation of this study was its small sample size, which did not permit to apply the results to a larger population.

Conclusions

The results of the present study demonstrated that mindfulness-based stress reduction training had positive effects on resilience in HIV-positive women. Indeed, this program should be applied to improve the resilience among HIV-positive women.

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Conflict of interest

The authors have no conflict of interest.

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