

Research Article

Impact of Mindfulness-based Stress Reduction Training on Third Grade High School Female Students' Mental Health and Educational Achievement

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Abstract: This study is conducted with the title of "Impact of Mindfulness-Based Stress Reduction training on third grade high school female students' mental health and educational achievement in Asadabad city during the school year 2011-2012. This study aims at investigating the impact of Mindfulness-Based Stress Reduction (MBSR) training on students' mental health and educational achievement. This research is conducted based on clinical trial with the empirical study (pretest-posttest method with the control group). Statistical population of this survey includes all third grade high school female students (780 students), who were educating in Asadabad city and the sample group contains 40 students who were selected according to the randomized cluster method (20 subjects in the empirical group and 20 subjects in the control group). Data collection tool for mental health structure includes the components of interpersonal sensitivity, obsessive thoughts, depression, anxiety and somatization which are selected from the General Health Questionnaire (SCL-90). Results indicated that the Mindfulness-based stress reduction training has affected the components of obsessive thoughts, interpersonal sensitivity, depression and anxiety after 8 sessions, but it has no effect on the somatization. Furthermore, the mindfulness training also has a positive effect on the educational achievement.

Keywords: Educational achievement, mental health, mindfulness, stress

INTRODUCTION

Academic drop-out and students' low level of educational performance are among the basic issues and problems in the individuals' academic lives and the educational system of each country. This phenomenon alters the learners' mental health in addition to leading to the large economic losses. In the field of educational achievement predictors, there are a group of cognitive and characteristic components which can play the role in explaining and predicting the educational achievement. The Mindfulness or self-awareness is among the considered cognitive features in this study. Mindfulness involves the special behavioral, cognitive and metacognitive strategies to centralize the attention process which in turn leads to the prevented the reduction spiral of negative mode-negative thinking-tendency towards the worry response, developed new perspective and creation of pleasant thoughts and excitement. Mindfulness-Based Cognitive Therapy (MBCT) is developed according to Kabat-Zinn Mindfulness Based Stress Reduction model and the cognitive principles have been added to it. This type of cognitive therapy includes various types of meditation, stretching Yoga, basic education about depression and several cognitive therapy training which indicate the relationship between the mood, thoughts, feelings and

physical senses. The concept of Mindfulness originates from the spiritual traditions of the East and considers a form of control which is developed through the Meditative practices (Baer, 2003, 2007). Meditative practices originate from Buddha traditions and are used as the Mindfulness-Based clinical programs by the-Western professionals (Linehan, 1993, quoted by Moore, 2008). Mindfulness is a particular way of attention, which is described by Kabat-Zinn (2003) as "An awareness which originates from the demand and objective and non-judgmental attention in Openness to experience at the present moment. The first three elements, which are proposed as the components of awareness and Mindfulness include: attitude, attention and intention (Shapiro *et al.*, 2006). The individual's personality characteristic is an important component in determining the risky hardships and pressures of life and the mental health is one of these characteristic. The components of lack of mental health such as depression and anxiety, hostility and sensitivity in the environments such as educational spaces can play the key role in interpersonal communication with other classmates or teachers. Adolescents are faced with important and challenging issues including the puberty, identity formation and transition from childhood to adulthood and job decision making or higher education and even getting ready for marriage each which can

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create the extra stress that may put the pressure on the resources for coping with stress and endanger their mental mental welfare. (Diks *et al.*, 1991; quoted by Coatsworth *et al.*, 2010) Implementing the mindfulness-based interventions, which are experienced with the meditation techniques, is essential for professionals and above all the implementation of mindfulness-based interventions in high school adolescents is increasing severely in clinical populations (Bootzin and Stevens, 2005; Singh *et al.*, 2007; Biegel *et al.*, 2009) and also the non-clinical populations (Wall, 2005; Beauchemin *et al.*, 2009) and they have shown their performance in various disorders and non-clinical populations. About the relationship between the educational achievement and stress, it can be argued that the educational achievement, as a multidimensional and complex structure is influenced by most of the cognitive, behavioral, motivational and personality factors. Among the personality factors, the stress and anxiety which people experience in these environments are among the components that have close connections with the individuals' performance in training situations. It is associated with the mental health as a strong predictor and the mental health also impacts the individuals' educational performance. This research first seeks to answer this question whether the MBSR, as a new approach, affects the female adolescents' mental health? And whether the Mindfulness-Based Stress Reduction Training (MBSR), as an adaptive approach, can affect the educational achievement?

RESEARCH LITERATURE AND BACKGROUND

According to the research, conducted by Azargoon *et al.* (2009) to determine the effectiveness of mindfulness training on reduced depression and rumination in 36 patients with depression, the results indicate the effectiveness of mindfulness-based cognitive therapy, so that a significant difference ($p < 0.01$) was seen in the scores of depression and rumination questionnaires by experimental group compared with control group. The qualitative observations also showed that this method is effective in enhancing the concentration as well as preventing the depression.

In a study entitled as "Investigating the effect of mindfulness-based skills training on reducing the students' anxiety" conducted on a group of 22 students (11 individuals as the experimental group and 11 ones as the control group), Beyrami and Abdi (2009) conducted that a significant difference is made between two groups at the level $p < 0.001$ in terms of anxiety scores and according to the intervention methods; so that the experimental group showed a significant decrease in anxiety scores compared with the control group. They found that the group sessions of mindfulness techniques training will lead to a significant reduction in the students' test anxiety.

In a research entitled as "The Effectiveness of Detached Mindfulness Techniques in Treating a Case of Obsessive-Compulsive Disorder on a 23-year-old student, Firouzabadi and Shareh (2010) concluded that the Detached Mindfulness Techniques are effective in the treatment of obsessive-compulsive disorder.

Narimani *et al.* (2010) conducted a research entitled as "Comparing the effectiveness of mindfulness training and emotion regulation on 47 chemical veterans' mental health". Results indicate that the mean score of mental health in a group under the mindfulness training was significantly improved compared to the group who received the emotion regulation training. Their research results indicated the effectiveness of mindfulness and emotion regulation training on improvement of chemical veterans' mental health. Therefore, the effectiveness of mindfulness and emotion regulation is significantly important in chemical veterans' mental health.

In a qualitative research, entitles as "Mindfulness-based cognitive therapy for the depressed suicidal patients", Hanasabzadeh *et al.* (2010) put five patients with depressive disorder and suicidal thoughts under the treatment for ten group therapy sessions according to the presented therapeutic guide.

Kabat-Zinn *et al.* (2006) conducted a research with the aim to investigate the effect of mindfulness training on the symptoms of obsessive-compulsive disorder in outpatients referred to the psychiatric and psychological service centers.

Bogels (2008) found in a research that the Mindfulness-Based Stress Reduction (MBSR) programs are effective in the adolescents' externalizing disorders and reduce the impulsivity and aggression in this population. These disorders include the Attention Deficit Hyperactivity Disorder (ADHD), Coping disorder and conduct disorder.

Furthermore, in a review study on the effectiveness of Mindfulness-Based Stress Reduction (MBSR), Praissman (2008) found that these programs can reduce the stress and anxiety in different populations.

Duncan *et al.* (2009) studied the positive effect of Mindfulness-Based on the depression Reduction in their study entitled as mindfulness and assessment.

Crane *et al.* (2010) suggested in a review study that the Mindfulness-Based Approaches lead to the prevented depression and reduced stress among the school teachers.

RESEARCH METHODOLOGY

This study has experimental type along with comparison of unequal control group (pretest-posttest with control group). The pre-test was initially done on both groups and then the experimental group was put under 8-session Mindfulness-based stress reduction training. Control group received no training and both groups were post-tested.

Population, sample and sampling method: Statistical population of this survey includes all third grade high school female students (780 students), who were educating in Asadabad city during the school year 2011-2012. Two classes were selected from one of the female high schools in Asadabad through Cluster Sampling. First, a high school was randomly selected and then the first-graders were randomly selected from target high school. Thereafter, two classes were randomly selected from them. Students were included in the study after obtaining their parents and their own written consents. This sampling method is cluster because the classes were determined from previous semester and it was impossible to change its participants. One of the classes was randomly selected as the experimental group and the independent variable was done on it and the second class, as the control group, received no intervention until the end of study. Before starting the intervention in the experimental group, both classes (groups) were evaluated with research tools (Pretest) and both control and experimental groups were assessed after ending the intervention through the research tools (Post-test).

Sample size: Sample size in this study is equal to 40 of which 20 ones were randomly selected as the experimental group and another 20 ones were randomly selected as control group.

Research tools:

Symptom checklist-90-revised (SCL-90-R): This questionnaire is so appropriate for quick assessment of type and severity of source symptoms through the self-evaluation. It is a tool for measuring the current level of symptoms which occur over a period of week. It consists of 90 descriptive statements about the symptoms and the patients are graded (at the range of nothing = 0 to severe = 4) based on their severity. The implementation usually takes time from 9 to 15 min. Symptoms are scored in 9 various dimensions and three overall indexes. Like MMPI-II, the mean is equal to 50 and the standard deviation of scores equal to 10. This questionnaire has four norm groups in order to compare the scores: outpatient psychiatric patients, non-patients, hospitalized psychiatric patients and non-patient adolescents. Its overall three indexes includes the General Severity Index (GSI), Positive Syndrome Distress Index (PSDI) and Positive Syndrome Total (PST) and its dimensions include the Somatization (SOM), Obsessive-Compulsive Disorder (O-C), Interpersonal Sensitivity (I-S), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic anxiety (PHOB), Paranoid ideation (PAR) and Psychosis (PSY).

Reliability and validity: In this study, the reliability coefficient is measured through Cronbach's alpha for 5

dimensions of symptoms including the obsession equal to 87%, somatization syndrome 87%, Interpersonal Sensitivity 91%, anxiety 90% and depression 89%, respectively. It is found in the validity survey that the scales both tests, MMPI and General Health Questionnaire (GHQ), have the convergent relationship with predicted dimensions in SCL-90-R and divergent relationship with other predicted scales (Derogatis, 1994, quoted by Marnat, 2003). In Iran, this questionnaire has a good validity and reliability too.

Data analysis method: Descriptive statistics is initially used in order to classify and display data. Independent T-test, Analysis of Co-Variance (ANCOVA) and Multivariate Analysis of Co-Variance (MANCOVA) are used in order to test the hypotheses. Kolmogorov-Smirnov (K-S) is also applied in order to investigate the normal distribution in the dependent variables and Levene's test is applied in order to testing the homogeneity of variances.

Levene's test for homogeneity of variances is shown in Table 1.

It is observed that the significance of Levine's test is higher than 0.05 for all variables, thus the homogeneity of variances hypothesis, which is one of the assumptions of analysis of covariance, is met and approved.

Given that the hypothesis of data normality was measured through the box plot and Diagram Q-Q and by Kolmogorov-Smirnov test and since the hypothesis of group homogeneity of variances is confirmed by Levine's test, the assumptions of analysis of covariance are met.

To answer the first research hypothesis, according to which the Mindfulness-based stress reduction reduces the high school female adolescents' obsessive-compulsive disorder, the results of ANCOVA test are summarized in the Table 2.

F value is significant for differences between groups (control and experimental) with the rate equal to 21.32 at the significance level $P \leq \frac{0}{0001}$. Therefore, the first hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training reduces the obsessive-compulsive disorders in high school female adolescents, is confirmed. Eta-Squared is equal to 0.53; in other words, 0.53 of obsession scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

Table 1: Levene's test for homogeneity of variances

Variable	Levine's statistic	d.f 1	d.f 2	Sig
Obsession	1.80	3	76	0.15
Somatization syndrome	0.61	3	76	0.61
Sensitivity	0.72	3	76	0.54
Anxiety	1.43	3	76	0.24
Depression	1.41	3	76	0.25
Educational achievement	1.63	3	76	0.19

Table 2: Results of ANCOVA test to compare the obsession scores in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	461.32	1	461.32	21.32	0.0001	0.053
Pre-test	71.120	1	71.120	3.290	0.0590	0.140
Error	411.27	19	21.640	-	-	-

Table 3: Results of ANCOVA test to compare the scores of somatization disorder in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	119.80	1	119.80	3.37	0.073	0.009
Pre-test	265.04	1	265.04	7.45	0.680	0.370
Error	675.25	19	35.540	-	-	-

Table 4: Results of ANCOVA test to compare the scores of interpersonal sensitivity in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	127.40	1	127.40	2.97	0.86	0.07
Pre-test	217.25	1	217.25	5.07	0.57	0.26
Error	814.30	19	42.850	-	-	-

Table 5: Results of ANCOVA test to compare the scores of anxiety in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	564.37	1	564.37	26.6	0.0001	0.68
Pre-test	87.230	1	87.220	4.11	0.5700	0.11
Error	403.24	19	21.220	-	-	-

To answer the second research hypothesis, according to which the Mindfulness-based stress reduction reduces the somatization disorder in high school female adolescents, the results of ANCOVA test are summarized as follows Table 3.

F value is not significant for differences between groups (control and experimental) with the rate equal to 3.37 at the significance level $P \leq \frac{0}{0001}$. Therefore, the second hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training reduces the somatization disorder in high school female adolescents, is not confirmed. Eta-Squared is equal to 0.009; in other words, 0.009 of somatization disorder scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

To answer the third research hypothesis, according to which the Mindfulness-based stress reduction reduces the interpersonal sensitivity in high school female adolescents, the results of ANCOVA test are summarized as follows Table 4.

F value is significant for differences between groups (control and experimental) with the rate equal to 2.97 at the significance level $P \leq \frac{0}{0001}$. Therefore, the third hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training reduces the interpersonal sensitivity in high school female adolescents, is confirmed. Eta-Squared is equal to 0.07; in other words, 0.07 of interpersonal sensitivity scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

To answer the fourth research hypothesis, according to which the Mindfulness-based stress reduction reduces the anxiety in high school female

adolescents, the results of ANCOVA test are summarized as follows Table 5.

F value is significant for differences between groups (control and experimental) with the rate equal to 26.6 at the significance level $P \leq \frac{0}{0001}$. Therefore, the fourth hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training reduces the anxiety in high school female adolescents, is confirmed. Eta-Squared is equal to 0.68; in other words, 0.68 of anxiety scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

To answer the fifth research hypothesis, according to which the Mindfulness-based stress reduction reduces the depression in high school female adolescents, the results of ANCOVA test are summarized as follows Table 6.

F value is significant for differences between groups (control and experimental) with the rate equal to 17.40 at the significance level $P \leq \frac{0}{0001}$. Therefore, the fifth hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training reduces the depression in high school female adolescents, is confirmed. Eta-Squared is equal to 0.49; in other words, 0.49 of depression scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

To answer the sixth research hypothesis, according to which the Mindfulness-based stress reduction increases the educational achievement in high school female adolescents, the results of ANCOVA test are summarized as follows Table 7.

Table 6: Results of ANCOVA test to compare the scores of depression in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	395.16	1	395.16	17.40	0.0001	0.49
Pre-test	83.220	1	83.220	3.660	0.4200	0.17
Error	431.63	19	22.710	-	-	-

Table 7: Results of ANCOVA test to compare the scores of depression in two experimental and control groups

Sources of changes	Total squares	d.f	Mean square	F value	Significance level	Eta-squared
Intergroup	463.74	1	463.74	20.36	0.0001	0.051
Pre-test	81.160	1	81.160	3.560	0.057	0.230
Error	432.79	19	22.780	-	-	-

F value is significant for differences between groups (control and experimental) with the rate equal to 20.36 at the significance level $P \leq \frac{0}{0001}$. Therefore, the final hypothesis, indicating that the Mindfulness-Based Stress Reduction (MBSR) training increases the educational achievement in high school female adolescents, is confirmed. Eta-Squared is equal to 0.051; in other words, 0.051 of educational achievement scores is resulted from implementing the independent variable Mindfulness-based stress reduction training.

RESULTS

To answer the first research hypothesis, according to which the Mindfulness-based stress reduction reduces the high school female adolescents' obsessive-compulsive disorder, the results of data analysis indicate that the independent variable reduces the obsessive-compulsive thoughts or behavior; thus the null hypothesis of research is rejected and the research hypothesis is accepted. Results of this hypothesis are consistent with the research by Firouzabadi and Shareh (2010) and they also indicated the impact of this method on treating the obsessive-compulsive disorder. To explain this hypothesis, it can be mentioned that in addition to the radical responsibility feeling, which is among the factors of obsessive thoughts, other reasons can be mentioned such as too much emphasis on the impressions, the individual's concern about the importance of controlling the impressions, too much estimation of risk, intolerance (uncertainty) and perfectionism. Since the second element of Mindfulness training includes the focused, comprehensive and sustainable attention and the substitute skills for paying attention to a stimulus to another and the third element, which is the informed intension and to intentional attention as the self-regulation, then training these skills will reduce too-much personal impressions and more logical encounter with intellectual and mental processes which affects the obsessive behavior and thoughts.

To answer the second research hypothesis, according to which the Mindfulness-based stress reduction reduces the somatization disorder in high school female adolescents, the results of ANCOVA test

indicate that stress reduction training has no effect on the somatization disorder. To explain this hypothesis, it can be argued that since the Mindfulness considers only the thought, mind, intention and attention, it has more effect on the thinking processes compared to disorders which have physiological origin and reason. It is most likely that if there were post hoc studies in the post-test, we would realize its effects over time due to the close relationship between the mental and physical health. However, no effect was observed on reducing the somatization disorder over time.

To answer the third research hypothesis, according to which the Mindfulness-based stress reduction reduces the interpersonal sensitivity in high school female adolescents, the findings of inferential results according to analysis of covariance indicate that the null hypothesis is rejected and the research hypothesis based on the effect of independent variable on the dependent variable is confirmed. In other words, the Mindfulness-based stress reduction training reduces the interpersonal sensitivity. The statistical samples as the adolescents are in a transition period and faced with challenging issues with individuals with different gender and each of these issues are created in them as a source of sensitivity which in turn can impose a lot of stress to the adolescents. Therefore, since Mindfulness training causes that the people have better understanding of themselves and especially the first element which is the attitude and people experience the non-judgmental, receptive, trusting, compassionate and kind attitude, the individuals become aware of relationships with others, social contacts are increased and in turn it decreases the interpersonal behavior. In other words, it can be argued that the Mindfulness training increases the awareness of relationship and it in turn reduces the interpersonal sensitivity. The results of this hypothesis are consistent with the research by Cohen and Semple (2010).

To answer the fourth research hypothesis, according to which the Mindfulness-based stress reduction reduces the anxiety in high school female adolescents, the results obtained from analysis of covariance indicate that the null hypothesis is rejected and research hypothesis is accepted. In other words, the Mindfulness training reduces the anxiety. To explore this hypothesis, it can be argued that the symptoms of anxiety are classified into internal or external

symptoms. The important internal symptoms include the individual's attention, thoughts and impressions and the important external symptoms include the heart palpitation, worry, low blood pressure, sweating and difficulty in breathing. Therefore, the Mindfulness training focuses on interpersonal processes and helps people to change their relationships with internal states, thoughts and feelings and thus reduces the internal symptoms of anxiety. For external symptoms, the techniques in training sessions including the muscle relaxation, deep concentration and muscle relaxation along with mental relaxation will lead to the normal breathing and reduced external symptoms of anxiety. Results of this hypothesis are consistent with the research by Rudolph (2002), Cohen and Semple (2010) and Beyrami and Abdi (2009).

To answer the fifth research hypothesis, according to which the Mindfulness-based stress reduction reduces the depression in high school female adolescents, the results of analysis of covariance for testing the hypothesis indicate that the null hypothesis is rejected and the hypothesis based on the impact of this training course is confirmed. To explain this hypothesis it can be argued that the depressed individuals initially applied the inefficient and defective thought processes and cognitive distortions or use these processes more than the healthy people. Mindfulness training strengthens the elements such as attitudes, attention and simultaneous intention in individuals and these strengthened elements enable the individual to develop a view in the experiences, thus the feelings, thoughts and emotions are changed from the transient phenomena including the judgmental, objective and not-detailed states to the receptive and non-judgmental thoughts and thus they feel the flexibility in mental processes. In other words, this change enables the individual to identify and stop the habitual patterns of mental states and start the responses which are more reflective rather than reactive and this lead to the full knowledge of inefficient and defective mental processes and replaced healthy mental processes. The results of this hypothesis are consistent with the research by Duncan *et al.* (2009) and Hanasabzadeh *et al.* (2010). They explained the positive impact of Mindfulness on depression reduction in their studies.

To answer the final research hypothesis, according to which the Mindfulness-based stress reduction increases the educational achievement in high school female adolescents, the results of inferential findings indicate that the null hypothesis is rejected and the research hypothesis is accepted. In other words, the-Mindfulness training increases the educational achievement. To explain this hypothesis according to the background of conducted research, it is more likely that the positive effect of Mindfulness training is due to the increased mental health and the mental health increases the educational achievement. Thus, it can be concluded that the mental health has the role of intermediate variable in relation to the educational

achievement. Furthermore, Beyrami and Abdi (2009) indicated in their study that the Mindfulness-Based technique training decreases the test anxiety in students and the test anxiety enhances the educational achievement.

Suggestions for future studies: The role of gender moderating should be investigated; in other words this training should be done on both genders and the role of gender should be investigated in this regard. The training results should be tracked over time; it means that the post hoc tests or projects should be used over time in order to assess the impact of this variable in the long-term, for instance, applying the A-B-B plan. In future studies, the researcher can investigate the relationship of this variable (Mindfulness) or its impact on the educational variables such as self-regulation, metacognition and meta-memory.

Practical suggestions: The education experts, teachers and parents should pay more attention to the influence of training and the previous courses such as the Mindfulness and skills in overcoming. Providing an educational package in this regard can be useful and helpful for teachers especially the school counselors. They should pay more attention to the mental health components as strong predictors of students' social health, success in life and educational achievement. The educational counseling brochures should be provided for students, so that they will be able to promote their mental health by the help of mentioned practices and overcome with the phenomena such as test anxiety and educational concerns. Conducting this research can be helpful and constructive for learners who are involved in the problems of test anxiety or interpersonal stress in the teacher-student or student-student relationships.

RESEARCH LIMITATIONS

Statistical population of this study includes the third grade high school female students and this can affect the generalizability of results. Limited time of implementing the training course and lack of full cooperation with the Mindfulness -Based Stress Reduction training course is also one of the limitations of this study. Given that the personality variables such as mental health are multi-factorial and complex, the use of questionnaire, as the only tool to measure it, is another limitation of this study. Since this study is conducted in a relatively traditional urban texture like Asadabad city, you should be careful in generalizing its findings to other areas and larger urban textures.

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