



Original Article

Comparing the effectiveness of cognitive therapy based on mindfulness with Jacobsen's relaxation technique on test anxiety in female elementary students

*Hassan Bagherinia¹; Fatemeh Bahrami²

¹Assistant professor, Department of Educational Science, Hakim Sabzevari University, Sabzevar, Iran.

²Assistant professor of educational psychology, Department of Educational Science, Hakim Sabzevari University, Sabzevar, Iran.

Abstract

Introduction: The research aims to determine the effectiveness of teaching techniques based on mindfulness and relaxation on students' test anxiety.

Materials and Methods: The statistical population of this descriptive-comparative study consisted of female students in the second year of the elementary Sama school in Sabzevar city-Iran (84 students). Thirty-six students with high score of test anxiety were selected and they were randomly divided into three groups (mindfulness training, muscle relaxation, and the control group). Two experimental groups received intervention during eight sessions. All participants simultaneously fulfilled test anxiety questionnaire one month after the intervention. Data analyzed through the t-test of independent groups, one-way analysis of variance, Tukey's test, and SPSS software.

Results: The findings showed that mindfulness training and Jacobsen's relaxation technique reduced test anxiety significantly in female students, but mindfulness training has greater effect size than relaxation technique (0.67 vs 0.58).

Conclusion: Based on the results, it seems that cognitive therapy based on mindfulness can reduce test anxiety in elementary students more than Jacobsen's relaxation technique.

Keywords: Mindfulness, Relaxation, Test anxiety

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Introduction

Educational organizations are considered one of the most important social systems (1). Appropriate education to achieve higher social, occupational, and economic positions is considered one of the main goals of parents and policymakers (2). Since students are the main parts of these educational systems, it is necessary to test in all the variables related to them with

more sensitivity and attention. To evaluate these systems, the student's performance should be investigated (3). It can be said that paying attention to people's beliefs and perceptions of their abilities is a factor in student's academic success (4). According to evidences, there is a negative relationship between academic performance and test anxiety (5). Test anxiety is a state of general anxiety and includes cognitive,

*Corresponding Author:

Department of Educational Science, Hakim Sabzevari University, Sabzevar, Iran.

hbagherinia@gmail.com

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physical, and behavioral responses related to the fear of failure, which, when it occurs, affects the academic performance of students (6). Test anxiety was defined as "groups of behavioral, physiological, and phenomenological responses associated with worry about possible negative consequences or failure in a test or similar evaluation situation" (7). Based on such anxiety, the person doubts his/her performance in the test, which causes performance analysis and a clear drop in the student's ability to solve problems (8). Test anxiety endangers a person's adaptations and harms self-esteem, success, efficiency, and academic performance (9). Students with less academic burnout and test anxiety had better academic achievement motivation than other students (10). Considering the negative impact of anxiety on students' performance, it is necessary to use all kinds of psychological, counseling, and planning services to help advance the mental health goals of students to prevent physical, psychological, academic, and economic damages (11). Among the anxiety treatments, mindfulness and relaxation are among the new methods that have received attention in recent decades. Mindfulness can be defined as "paying attention in a specific way, with a purpose, in the present and without judgment" (12). The two main streams of mindfulness, which other approaches are also based on these two streams, are: a) stress reduction based on mindfulness two and b) cognitive therapy based on mindfulness (13). Education based on mindfulness can be effective in reducing depression, anxiety, and stress (14). Studies showed that mindfulness reduces adolescent girls' physical and cognitive anxiety, and improves their self-confidence more than student-athletes who received relaxation therapy (15). The findings showed that the treatment based on mindfulness improves the goal orientation in students, which in the meantime, affects creating motivation and interest in students, enjoying learning for its own sake rather than getting rewards, self-regulation, choosing appropriate strategies for solving problems, increasing awareness in daily life activities and reducing mental stress in students (16). Ramezani and Deljoo showed that -mindfulness training and self-regulation learning reduce students' test anxiety, and mindfulness is more effective (17). In addition to reducing anxiety, optimism and mindfulness training programs effectively reduce academic boredom in students with test anxiety (18). Relaxation is a

non-pharmacological method of anxiety control. Mental relaxation techniques are called body-to-mind techniques because their main purpose is relaxation through the mind, generally divided into two parts, physical and mental (19). Researchers found that two methods of muscle relaxation and mental imagery reduce patients' anxiety (20). On the other hand, relaxation only by working on the muscles and creating opposite physiological effects of anxiety leads to the reduction of anxiety, while mindfulness by focusing on thoughts, feelings, and perception, in addition to creating physiological effects, creates cognitive effects. Therefore, considering the importance of test anxiety and its consequences on students, the need for appropriate intervention, and lack of research in this field, the present study aimed to assess the effectiveness of mindfulness-based cognitive therapy and Jacobsen's relaxation technique on test anxiety in female elementary students.

Materials and Methods

This statistical community of the present study included all female students in the second year of Sama elementary school in Sabzevar city (84 students). Using the convenient sampling method and based on the Spielberger Test Anxiety Inventory (TAI) score in the pre-test stage, 36 cases were selected. The inclusion criteria, included: being female students in the second year of elementary school (aged 8 to 9 years), having high test anxiety score (one standard deviation higher than the average of the entire sample), not participating in other treatment programs at the same time, and not receiving individual counseling or medical therapy, willingness and informed consent to participate in the research. The exclusion criteria included: having serious and limiting medical diseases that cause anxiety, the use of psychiatric medications that affect anxiety symptoms, or simultaneous participation in other counseling sessions. The samples are randomly divided into three equal groups (A, B, and C). Group A received cognitive therapy based on mindfulness, group B received Jacobsen relaxation technique, and group C assigned in the waiting list (21). To considering the ethical issues, the researchers obtained the necessary permits from the university, and all participants were aware about the objectives and they had full consent. Also, the participants fulfilled the questionnaires without name or details.

Research instruments

A) *Test Anxiety Inventory (TAI)*: Spielberger developed this questionnaire. This questionnaire has 20 items that describe the reaction before, during, and after the test. The test anxiety inventory includes two subscales, "worry" and "excitability," that measure individual differences in test anxiety. This is a self-report questionnaire, and the subject answers each item based on a four-point scale ("rarely", "sometimes", "often", "almost always"). These options are scored based on 1, 2, 3, and 4, respectively. Also, a person's minimum and maximum scores in this test will be 20 and 80, respectively. In this questionnaire, items 1, 3, 5, 7, 9, 12, 14, 16, 17, and 19 are components of worry, and items 2, 4, 6, 8, 10, 11, 13, 15, 18, 20 are components of excitability (22). The reliability coefficients of internal consistency ($r=0.92$), split ($r=0.92$), and retest ($r=0.90$) of this list have been reported as good and satisfactory (23). The retest reliability coefficient after three weeks and one month has been reported as 80% (21). Saadipour et al. reported its psychometric properties as satisfactory (13).

El-Zahhar (24), Anton et al. (25), and Bandalos et al. (26) have reported Cronbach's alpha coefficient of this questionnaire between 0.92 and 0.97. The total correlation of the Spielberger questionnaire with the test anxiety inventory in boys and girls has been reported as 0.86 and 0.77, respectively. These coefficients indicate a good and satisfactory validity of this inventory (27).

Mindfulness training package. The training package of mindfulness strategies based on the theories of Zindel, Segal, and Williams was implemented in 8 sessions (28). The content of this package is summarized below:

First session: General formulation of references, model introduction, automatic guidance against mindfulness.

Second session: Focusing on the body and experiencing bodily sensations is another way to gain awareness of inner experiences to deal with obstacles and problems.

Third session: Introduction of sitting meditation practice and logic, mindfulness on breathing.

Fourth session: Staying in the present, sitting meditation, awareness of breathing sounds and thoughts.

Fifth session: Acceptance of permission to attend, sitting meditation (deliberately bringing problems/difficulties to mind.

Sixth session: Negative thoughts and moods limit our connection to experience, thoughts are not truths, how to work with emotional pain: Your suffering is not equal to yours, but you can do many things for healing and health.

Seventh session: How to take good care of yourself.

Eighth session: Summarizing what has been learned for the future and a new beginning for the rest of life, regular mindfulness practice helps to maintain balance in life.

Muscle relaxation by the Jacobsen method

This research refers to muscle relaxation by Jacobsen's method, the following five steps of training, which is necessary for clients to practice for one month with the help of a trainer and educational DVDs (29,30).

1- Relax your whole body. Try to feel your weight on the bed or chair as much as possible. Allow your weight to be transferred to the bed or chair. Feel heavy, like a sack of potatoes.

2- Put your hands on the sides in a loose and hanging position. Allow your legs to be loose and dangling. The shoulder let go and throw it away. Relax all parts of the body from top to bottom.

3- If you have not done relaxation exercises before, you must learn how to relax your muscles. Tighten the muscles of the upper part of your legs so that you can no longer make them rigid. Now loosen them. You will feel the difference between muscle tightness and relaxation. Do the same from the top of your head to the tip of your toes.

4- Now you feel your muscles are less tight than when you started exercising. When you get used to this exercise, you will no longer need to tighten your muscles before relaxing them.

5- When you feel calm and relaxed, slowly slow down your breathing. Just focus on your breathing. Your inhalation time should equal your exhalation time, i.e., long and slow.

If you feel lightheaded, stop doing this. After 20 minutes, you will feel better than when you started the exercise. You feel more relaxed and rested.

Results

In the present study, 36 girls (aged 8 to 9 years) in three groups participated. Table 1 presents the descriptive statistics related to the mindfulness group, relaxation group, and the control group. Tables 2 and 3 show the t-test results related to the mindfulness group, relaxation group, and the control group.

Table 1. The descriptive statistics of the three groups

Group	Pre-test (Mean ± SD)	Post-test (Mean ± SD)
Mindfulness	69.23 ± 9.24	36.12 ± 8.74
Relaxation	65.42 ± 9.36	45.23 ± 9.51
Control group	74.32 ± 9.22	73.90 ± 9.46

Table 2. T-test results related to the mindfulness group and the control group

Variable	Group	Mean	Standard deviation	T	Degrees of freedom
Test anxiety	Control	73.90	46.90	96.90	22
	Mindfulness	36.12	8.74		

Table 3. T-test results related to the relaxation group and the control group

Variable	Group	Mean	Standard deviation	T	Degrees of freedom
Test anxiety	Control	73.90	46.90	72.20	22
	Relaxation	45.23	9.51		

Based on the results, both interventions reduced effectively test anxiety in girl students. Also, according to the findings of Table 1, the mean score of mindfulness group was lower than the relaxation group. Table 4 presents the analysis of variance to compare the effects of mindfulness training and relaxation technique

training on test anxiety. The results of the one-way analysis of variance showed that there is a significant difference between the studied groups in terms of the level of anxiety at the level of 0.001. Table 5 shows Tukey test results in terms of the effectiveness of mindfulness and relaxation on test anxiety.

Table 4. Analysis of variance comparing the effects of mindfulness training and relaxation training on test anxiety

Source of change	Sum of squares	Degrees of freedom	Mean squares	F	P	Effect size
Effect of the agent	542.361	1	542.361	59.82	0.001	0.69
Error	1993.458	22	9.16			
Total	7413.819	23				

Table 5. Tukey test results in terms of the effectiveness of mindfulness and relaxation on test anxiety

Group	The difference between the means	Standard error	P
Mindfulness group Relaxation group	9.11	2.63	0.031
Mindfulness group Control group	36.97	2.63	0.001
Relaxation group Control group	27.86	2.63	0.001

The differences between the mean scores of both interventions and the control group were high, but the mean difference of mindfulness group compared to relaxation group is 9.11. Tukey's post hoc test, showed a significant difference between the mean scores of the

mindfulness group and the relaxation group ($P=0.031$). Table 6 shows that reducing test anxiety through mindfulness has an effect size of 0.67, more effective than reducing anxiety through relaxation training with an effect size of 0.58.

Table 6. Parameter estimate of the effectiveness of training techniques based on mindfulness and relaxation in reducing test anxiety

Parameter	B	Standard error	t	P	Confidence level 95% Upper limit	Confidence level 95% Lower limit	Effect size
Width from origin	73.09	2.01	29.91	0.001	69.07	77.11	0.93
Mindfulness	36.97	2.63	97.90	0.001	42.23	-31.71	0.67
Relaxation	27.60	2.63	7.32	0.001	32.86	-34.22	0.58

Discussion

The results of the present study indicated that both interventions of mindfulness and relaxation training reduced test anxiety in elementary students, but the mindfulness training was more effective than relaxation.

A study by Bohlmeijer et al. on people suffering from chronic medical diseases has shown that Mindfulness Based Stress Reduction (MBSR) affects depression, anxiety, and psychosocial adjustment. Most of the investigated people were women (aged 45-55 years) and they had cancer, chronic pain, fibromyalgia, chronic fatigue, and rheumatoid arthritis. The results indicated that the effect of mindfulness on anxiety is greater than depression (31).

Esmaili et al. investigated the effect of mindfulness-based therapy, relaxation, and medical therapy in reducing test anxiety in 90 female students aged 12 to 14 years of gifted schools in Khorramabad city-Iran, using Spielberger test anxiety inventory. Based on the findings, mindfulness and medical therapy were effective in reducing the test anxiety. However, the relaxation did not have a significant effect. The results related to the effectiveness of mindfulness were the same as our research, and the results of relaxation were different from our study (32).

Manavipour et al. investigated the effectiveness of the mindfulness training on test anxiety in 24 students in Garmsar city-Iran through the Cassidy and Line method and Manavipour's test anxiety.

According to the findings, mindfulness reduces test anxiety (33). The results of Khorrami et al.'s research on 11th-grade female and male students in Tehran using Faridin's anxiety session and the school attitude questionnaire of McCutch and Siegel are consistent with the results of the present study and mindfulness is effective in reducing anxiety and increasing school attitude (34). According to Ghamari and Hosseini's research, mindfulness training reduced anxiety in 90 high school female students (35).

In addition, Yazdi et al. found that MBSR was effective on students' anxiety in Qorve city-Iran. They used Abolghasemi test anxiety questionnaire (36).

According to Saadipour et al.'s research, mindfulness training effectively reduces students' high and low-anxiety procrastination

on sixth-grade girls in Sari city-Iran. They used Solomon's academic procrastination questionnaire and Spielberger's test anxiety (13). In addition, Nik Nesab et al. concluded that mindfulness and mental imagery reduced the level of cortisol and anxiety in 45 in officer students (37).

Also, psychomotor relaxation is effective in reducing anxiety. According to the research of Allahyari et al. the relaxation by Silva method reduces anxiety in patients with generalized anxiety disorder (30).

According to Roodsarabi et al.'s research on the sports anxiety of teenage girls aged between 11 and 15 years in Tehran-Iran through Martens Competitive Anxiety Questionnaire and a similar relaxation method, mindfulness has a greater effect on reducing anxiety than relaxation. These results are the same as our research (38).

Karami et al. confirmed the effectiveness of Jacobsen's muscle relaxation training on depression, anxiety, and stress of 30 infertile women with moderate to severe anxiety (39). Khabiri et al. studied 36 elite Wushu athletes. They found that relaxation exercises such as muscle progressives, and visualization reduce the level of cortisol, competitive anxiety, and improve the self-confidence of elite athletes (40). The present study has some limitations such as limited samples to elementary school girls. Also, only relaxation by Jacobsen's technique was investigated. It is suggested that other relaxation methods, including visualization, muscle progress, and schema therapy be investigated in future studies. Also, holding training workshops based on mindfulness can reduce anxiety in male and female students of all educational levels.

Conclusion

The results indicated both mindfulness training and relaxation training can reduce elementary students' test anxiety. But mindfulness training has a greater effect than relaxation technique.

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