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The effectiveness of mindfulness training on coping with stress, exam anxiety, and happiness to promote health

Hajar Zandi, Ali Amirinejhad¹, Akbar Azizifar², Sehat Aibod¹, Yousef Veisani¹, Fathola Mohamadian³

Abstract:

BACKGROUND: Mindfulness as an intervention approach in mental health has been increasingly used to promote health in young people. The aim of this study was to investigate the effectiveness of mindfulness training on coping with stress, test anxiety, and happiness to promote health in female high school students.

MATERIALS AND METHODS: The design of this study was quasi-experimental with control group, with pretest and posttest. The statistical population of the study included all the female students studying in the secondary high school in the city of Sanandaj in Iran with 2890 students, 40 of whom were selected by simple random sampling method and were randomly assigned to the experimental (20 individuals) and control groups (20 individuals). Participants completed the Oxford Happiness (0.79), Sarason Exam Anxiety (0.87), and Andler and Parker Stress Management (0.81) Questionnaires. The method of intervention was training based on mindfulness. Data were analyzed using covariance analysis.

RESULTS: The results showed that in the posttest, a significant difference was seen between the mean scores of the participants of the experimental and control groups in the variables of problem-oriented, emotion-oriented, and avoidant coping variables ($P < 0.05$). In addition, the results showed that in the posttest, there was a significant difference between the mean scores of test anxiety; happiness; and happiness components including life satisfaction, self-esteem, active well-being, satisfaction, and positive mood ($P < 0.05$).

CONCLUSIONS: Based on the results of the present study, it can be said that mindfulness training is an effective intervention to improve coping styles, test anxiety, and happiness in students.

Keywords:

Anxiety, coping with stress, female students, happiness, mindfulness training

Introduction

Society, especially education and training, is interested in the fate, growth, and development of successful students and their place in the society, and expects them to progress in various aspects, including cognitive dimensions, skill acquisition and ability, personality, and emotional and behavioral dimensions.^[1] Among the factors

that affect students' education are coping styles, test anxiety, and happiness.^[2]

Coping with stress includes action-based and intra-psychological activities, which are used to manage and regulate environmental, internal, and conflictual demands, and it has two important functions, namely setting up emotion dysregulation and taking action to change and improve the problem that is causing the resentment. In general, there are

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Department of Psychology,
Faculty of Human
Sciences, Islamic Azad
University, Tehran,
Iran, ¹Psychosocial
Injuries Research
Center, Ilam University
of Medical Sciences,
Ilam, Iran, ²Department
of Psycholinguistics,
School of Medicine,
Ilam University of
Medical Sciences, Ilam,
Iran, ³Department of
Psychology, Psychosocial
Injuries Research Center,
Ilam University of Medical
Sciences, Ilam, Iran

Address for correspondence:

Dr. Fathola Mohamadian,
Department of Psychology,
Psychosocial Injuries
Research Center, Ilam
University of Medical
Sciences, Ilam, Iran.
E-mail:
mobinmohamadian@
yahoo.com

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three types of coping styles in dealing with stress, namely problem-oriented, emotion-focused, and avoidant coping style.^[3] The concept of test anxiety is also one of the most important cognitive-emotional variables that Roy *et al.*^[4] have started serious research on. According to them, this phenomenon consists of two cognitive and physical components. The cognitive component is the feeling of inefficiency, the expectation of punishment and helplessness, and the physical component includes emotional arousal and physiological reactions.^[5] Another major problem in the educational life of individuals and educational systems in any country is the issue of students' happiness. Flanagan *et al.*^[6] consider happiness to include three dimensions of desirable life, committed life, and meaningful life. A desirable life includes positive emotions and feelings about the past, present, and future, and in general, it means maximizing positive emotions and minimizing the negative emotions and the pain caused. Committed life includes the use of talents and abilities at the time of facing with challenges in order to achieve desires. Meaningful life is the sense of attachment and service to a greater purpose besides oneself which may include family, friends, work, and religion.^[7] The more time a person spends on positive emotions, the less remains for negative emotions. Researchers emphasize that when stress decreases, happiness and well-being would increase.^[8]

Stress can affect students' mental and physical health and lead to a decline in academic achievement.^[9] Styles of coping with maladaptive stress can lead to psychological trauma in students.^[10] In some cases, students who experience high levels of stress may use maladaptive coping strategies such as substance abuse and alcohol to overcome their stress.^[11] On the other hand, the highest dropouts occur in students with test anxiety and low scores on happiness.^[12] Carter *et al.*^[13] reported that the prevalence of test anxiety in American students was 31%–41%. Rajiah and Saravanan^[12] reported a 25.62% increase in high school girls.

Therefore, considering the effects of stress, test anxiety, and low happiness in students, examining the effect of psychological treatment strategies to improve coping with stress, reduce test anxiety, and increase happiness can be important. One of the therapeutic strategies in this field is mindfulness. Mindfulness is defined as the state of purposeful attention along with nonjudgmental acceptance of experiences occurring in the present moment and awareness of what is happening in the present moment.^[14] Mindfulness means being in the moment with everything that is now, without judging and without commenting on what is happening, it means helping the person to understand that pleasant and unpleasant emotions can occur.^[15] This type of treatment includes various meditations, introductory

training on depression, body examination exercises, and several mindfulness exercises that show the relationship between mood, thoughts, feelings, and senses of the body.^[15] Mindfulness teaches thinking skills in a cognitive context.^[14] The aim of this treatment is to improve cognitive, emotional, and behavioral control by increasing the flexibility between the conceptual state of mind (planning, thinking) and the perceptual state (touch, hearing, etc.). Experiencing the perceptual state rather than the conceptual state reduces the effect of past beliefs on information processing and subsequent emotional responses. Cognitive flexibility reflects mental health and well-being. Some research has shown the effectiveness of mindfulness training on coping styles,^[16,17] test anxiety,^[18] and happiness^[19,20] in various examples such as the elderly, students, and patients with physical and mental illnesses. Despite previous research and emphasis on the psychological aspects of learning, and especially mindfulness, this postlearning still requires more extensive research. In this regard, considering the sensitivity of adolescence and the pressures of educational problems, the present study was conducted to investigate the effectiveness of mindfulness training on coping styles with stress, test anxiety, and happiness in students.

Materials and Methods

The design of this study was quasi-experimental with control group, with pretest and posttest. The statistical population of this study included all the female students studying in the secondary school (high school) in Sanandaj in Iran with a total of 2890 students. First, initial screening for test anxiety, coping styles with stress, and happiness was performed using research questionnaires. The statistical sample consisted of forty students who were selected by simple random sampling method; they were randomly assigned to two experimental (twenty individuals) and control (twenty individuals) groups. Criteria for entering the study included conscious satisfaction and willingness to participate in the research and having test anxiety according to the scores of the Saracen Test Anxiety questionnaire. Criteria for withdrawal from the study also included reluctance and unwillingness to participate in the study, failure to attend more than two sessions of treatment sessions, and receiving other similar psychological treatments. The following tools have been used to collect the data.

Oxford Happiness Questionnaire

This questionnaire has 29 items and measures a person's happiness. The theoretical basis of this questionnaire is the definition of happiness by Argyle and Crossland (in order to provide an operational definition of happiness; they consider it as a structure with three important parts, namely frequency and degree of positive

emotion, average level of satisfaction during a period, and no negative feeling. The test was developed in 1989 by Michael Argyle based on the Beck Depression Inventory (BDI).^[21] The 21 phrases in this questionnaire were taken from the BDI and reversed and 11 questions were added to cover other aspects of mental health. Each question in this questionnaire has four options, and the person must choose one according to the current situation. Each item is scored on a 4-point Likert scale from 0 to 3. The highest score that an individual can get on this scale is 87, which indicates the highest happiness level, and the lowest score on this scale is 0, which indicates a person's dissatisfaction with life and depression. The normal score for this test is between 40 and 42. The psychometric characteristics of this scale have been confirmed in Iran.^[22] In the present study, Cronbach's alpha was 0.79 for the whole questionnaire.

Questionnaire to coping with stressful situations

This questionnaire, developed by Endler and Parker,^[23] includes 48 items that measure three coping styles, including problem oriented (16 items), emotion oriented (16 items), and avoidance (16 items). Each item is scored on a 5-point Likert scale (from never to very much). The creators of this questionnaire reported its validity and reliability at a very high level for both adult and adolescent scales. In Iran, Shokri *et al.*^[24] obtained Cronbach's alpha for the whole scale as 0.83 and for problem-oriented, emotion-oriented, and avoidant as 0.81, 0.86, and 0.79, respectively. In the present study, Cronbach's alpha was 0.81 for the whole questionnaire and 0.83, 0.79, and 0.78 for the subscales, respectively.

Sarason Test Anxiety questionnaire

This questionnaire, designed by Sarason to measure test anxiety, contains 37 items in a two-choice format (right or wrong). In this way, based on a self-report method,

the psychological states and physiological experiences of the individual during and before the exam can be achieved. Choosing the right option indicates anxiety and gets a score of 1, whereas the wrong option for each phrase means no anxiety and gets a score of 0. Phrases 3, 27, and 33 are inverse and have a reverse score. By summarizing the scores, the overall score of the test anxiety is obtained, and a score above 20 on this scale indicates the anxiety of the pathological test that causes the person to have a dysfunction. Aghajani *et al.*^[25] in their study reported Cronbach's alpha of this scale as 0.71. In the present study, Cronbach's alpha was 0.87 for the whole questionnaire.

Procedures

After selecting the sample, the research questionnaires were given to both experimental and control groups in the pretest stage, and after collecting the questionnaires, mindfulness-based training sessions [Table 1] were presented to the experimental group and the participants in the control group did not receive any training. At the end of the training sessions, after 2 weeks, the posttest was run on experimental and control groups.

Statistical analysis

Data were collected and analyzed using descriptive statistics mean, frequency, standard deviation, and multivariate; analysis of variance, the analysis of results was performed by SPSS Inc., version 22, Chicago, Ill., USA, at the significant level of ($\alpha = 0.05$).

Ethical considerations

Before conducting the research, the researcher first provided the necessary explanations about the purpose of the research; instructions on how to complete the self-report questionnaires and how to publish the study results, confidentiality of students' identity and personal

Table 1: Summary of mindfulness training sessions

Sessions	Summary of the content of the sessions
First session	Communication, definition, and conceptualization and the need to use mindfulness training. Eating raisins is a conscious mind (a meditation in which participants spend a few minutes examining the sensory-visual, olfactory, taste, and touch characteristics of a raisin seed) Homework: Physical examination within 6 days: Doing conscious mind is a normal daily activity (washing, eating, brushing, etc.)
Second session	Coping with obstacles. Practice thoughts and feelings, homework: record pleasant events
Third session	Presence of mind or breathing technique. Meditation sitting; homework: Breathing space 3 min three times a day. Walking conscious mind; recording unpleasant events
Fourth session	Staying in the present. Seeing meditation/hearing meditation; homework: Sitting meditation. 3 min of breathing space whenever they notice unpleasant stress and excitement
Fifth session	Permission and license. Sitting meditation; homework: sitting guided meditation
Sixth session	Thoughts are not facts. Seated meditation visualization; homework: Shorter guided meditation for at least 40 min. Vague scenarios; homework: 3 min of breathing space not only three times a day, but also whenever they notice stress and unpleasant emotions
Seventh session	Take care of yourself. Mention of the relationship between mood and activity; homework: 3 min breathing space not only three times a day, but whenever they notice stress and unpleasant emotions. Discuss the signs of the problem
Eighth session	Use what you have learned. Physical examination, reflection, feedback

information, and informed consent and willingness to participate or not.

Results

The mean and standard deviation of pre- and post-test scores, stress coping styles, test anxiety, and happiness of the individuals in the experimental and control groups are presented in Table 2.

The results of Table 3 showed that there was a statistically significant difference between the two groups in the posttest scores of the problem-oriented coping ($P = 22.29$, $P < 0.05$). Based on the Eta coefficient, 66% of the difference between the experimental and control groups in problem-oriented coping scores was related to the effect of mindfulness training. In this way, mindfulness training was effective on increasing the problem-oriented coping skills and increased it.

Table 2: Mean and standard deviation of dependent variables in experimental and control groups in pretest and posttest stages

Variables	Group	n	Pretest		Posttest	
			Mean	SD	Mean	SD
Stress-coping styles						
Problem oriented	Experimental	20	29.86	7.08	33.60	8.22
	Control	20	27.75	6.55	27.60	6.40
Emotion oriented	Experimental	20	26.91	5.63	28.10	6.61
	Control	20	27.00	5.73	26.89	5.50
Avoidance	Experimental	20	32.05	5.99	26.30	4.12
	Control	20	31.61	4.78	31.59	4.75
Test anxiety	Experimental	20	29.86	6.22	19.33	4.01
	Control	20	28.62	5.11	28.58	5.07
Happiness						
Life satisfaction	Experimental	20	14.23	3.15	16.00	4.11
	Control	20	13.67	2.79	13.60	2.74
Self-esteem	Experimental	20	11.32	3.13	14.17	4.45
	Control	20	12.19	3.27	12.22	3.30
Subjective well-being	Experimental	20	14.20	3.61	16.69	4.42
	Control	20	14.09	3.54	14.05	3.50
Satisfaction	Experimental	20	13.00	3.20	15.76	4.83
	Control	20	13.37	3.15	13.33	3.04
Positive mood	Experimental	20	12.07	3.19	14.00	4.70
	Control	20	12.24	3.20	12.13	3.08
Happiness	Experimental	20	57.89	6.22	64.19	8.49
	Control	20	56.63	6.02	56.31	5.88

SD=Standard deviation

Table 3: Analysis of covariance of mindfulness training on coping skills in experimental and control groups after controlling the intervening variable (pretest), in the posttest phase

Scale	Indicator variable	df	Mean squares	F	P	Eta coefficient	Statistical power
Problem oriented	Pretest	1	211.73	18.45	<0.05	0.54	0.52
	Group membership	1	215.56	22.99	<0.05	0.66	0.68
Emotion oriented	Pretest	1	97.75	31.14	<0.05	0.52	0.45
	Group membership	1	105.69	34.55	<0.05	0.63	0.75

The results also showed that there was a statistically significant difference between the emotion-oriented coping in the experimental and control groups in the posttest phase ($F = 34.55$, $P < 0.05$). Based on the Eta coefficient, 63% of the difference between the experimental and control groups in the emotion-oriented coping scores was related to the effect of mindfulness training. In this way, mindfulness training has a significant effect on emotion-oriented coping skills.

Furthermore, the results showed that there was a statistically significant difference between the avoidant coping between the experimental and control groups in the posttest phase ($F = 27.41$, $P < 0.05$). Based on the impact factor, 60% of the difference between the experimental and control groups in the avoidant coping scores was related to the effect of mindfulness training. In other words, despite the control of avoidant coping in the pretest stage, the rate of avoidant coping in the posttest stage decreased in the experimental group. In this way, mindfulness training has a significant effect on avoidant coping.

The results of Table 4 based on covariance analysis showed that the observed difference between the mean scores of the studied variables (coping skills, test anxiety, and happiness) was statistically significant in terms of group membership (two experimental and control groups) in the posttest phase ($P < 0.05$). Therefore, mindfulness training in the posttest stage had a statistically significant effect on the scores of the experimental group in these variables ($P < 0.05$).

Discussion

The aim of this study was to investigate the effectiveness of mindfulness training on coping with stress, test anxiety, and happiness among secondary school female students in the city of Sanandaj. The results showed that mindfulness training has a positive and significant effect on problem-oriented coping skills. This study finding is consistent with the results of previous studies.^[16,26,27] One of the important advantages of mindfulness training is that people effectively learn to deal with negative thoughts and emotions. On the other hand, mindfulness through deep breathing and thinking causes mental representation and evaluation of current events. Furthermore, training conscious

Table 4: Covariance analysis of mindfulness training on research variables in experimental and control groups after controlling the intervention (pretest) variable, in the posttest phase

Scale	Indicator variable	df	Mean squares	F	P	Impact rate	Statistical power
Problem oriented	Pretest	1	211.73	18.45	0.034	0.540	0.519
	Group membership	1	215.56	22.99	0.001	0.662	0.680
Emotion oriented	Pretest	1	97.75	31.14	0.044	0.523	0.448
	Group membership	1	105.69	34.55	0.001	0.630	0.754
Test anxiety	Pretest	1	22.19	12.62	0.040	0.395	0.276
	Group membership	1	40.63	29.21	0.006	0.606	0.788
Happiness	Pretest	1	13.619	0.176	0.019	0.124	0.476
	Group membership	1	46.374	0.331	0.001	0.626	0.706

attention to the present tense and dealing with annoying feelings and thoughts leads to cognitive changes and reduced psychological symptoms, which subsequently reduce inconsistent coping methods, increase the use of problem-oriented coping, and reduce the use of emotion-oriented coping and avoidance.^[16,28-30] Mindfulness skills can increase people's ability to solve problems efficiently.^[31] Therefore, mindfulness training can be effective in dealing with the challenges of daily life in individuals, and in fact a person considers the problems and concerns caused by individual and interpersonal life situations as a challenge and cope with them with flexibility. Instead of dealing with them or avoiding them, the person will actively focus on the problems and, as a result, will solve the problems, which will be an adaptive and problem-oriented confrontation. In addition, familiarizing the person with mind presence technique makes them more aware of unpleasant events and, by using what they have learned, they can use their abilities and experiences without stress in the face of them and deal with them in a problematic way.

Furthermore, the results of the present study showed that mindfulness training has a reversible and significant effect on emotion-oriented coping skills. This finding is consistent with the results of previous studies.^[16,32] Mindfulness has a negative relationship with the emotion-oriented coping style.^[33] Increasing mindfulness leads to reduced mental confusion, unpleasant emotions, and reduced use of maladaptive coping strategies such as worry, thus reducing the use of emotion-oriented coping styles.^[14] In explaining this finding, it can be said that mindfulness by creating moment-by-moment awareness and behavioral orientation based on wise responsibility instead of automatic and irrational responsiveness, enables a person to create a different relationship with experiencing inner feelings and external events. By purposeful using of higher functions of the mind such as attention, awareness, kind attitude, curiosity, and compassion, one can effectively overcome one's emotional reactions.^[34] Thus, people who show higher levels of mindfulness are less likely to use negative self-reported thoughts and believe that they are able to free themselves from such thoughts. The use of

mindfulness-based training can trigger a metacognitive way of processing information and increase flexibility in response to a variety of stresses and threats, including life stresses.^[35] In fact, mindfulness offers a different way of dealing with emotions. As a result of this awareness, instead of incompatible confronting or using the method of suppressing negative emotions in the face of interpersonal situations and challenges, it will be more appropriate to use emotion-oriented coping and position-appropriate emotion management.

The results of the present study also showed that mindfulness training has a significant and adverse effect on avoidant coping, thus reducing avoidant coping in students. This research finding is consistent with the results of previous studies.^[17,36-39] Explaining this finding from the study, it can be said that when a person participates in mindfulness training sessions, his or her awareness and attention to the past increases and, unlike in the past, he or she does not visualize him/herself in the face of passive challenges and situations. Therefore, the person has the opportunity to respond to the current experience with useful information that he/she has from the current experience and not as a result of conjectures, prejudices, and irrational thoughts; This way of responding to the problems and challenges of the educational and living environment leads to the solution of the problem actively and the reduction of withdrawal and avoidance. Mindfulness has a negative relationship with avoidant coping style.^[40] Exercise increases mindfulness, self-awareness, and physical and cognitive awareness; and in turn it leads to self-assessment. Moreover, planning is facilitated, and the person experiences positive mental states. Therefore, relaxation and paying attention to the present and increasing awareness will lead to a reduction in the passive method of avoidance.

Another result of this study was that mindfulness training has a significant and an inverse effect on students' test anxiety in a way that reduces test anxiety in students. This finding is consistent with the results of previous studies.^[18,41-43] In explaining this finding, it can be said that mindfulness through the combination

of vitality and clear seeing of experiences can make positive changes in people's happiness and well-being.^[44] Because the mindfulness training program enhances both mental and behavioral performance, participants in the mindfulness program can be expected to have a more positive attitude toward their abilities and to deal with anxiety successfully.^[45] It also seems that mindfulness education, by encouraging people to rehearse frequently, focusing on neutral stimuli and purposeful awareness on the body and mind, frees anxious people from engaging in mindfulness with threatening thoughts and worries about performance on the exam, and the negative automatic thoughts would have no place in the mind.^[46] This means that these techniques reduce a person's anxiety and physical stress by increasing his/her awareness of current experiences and returning attention to the cognitive system and more efficient information processing. Mindfulness training is one of the educational and therapeutic methods in which the mental representation of objects in life, which are out of the direct control of human beings, through breathing and thinking is taught to the individuals. This treatment is a combination of relaxation and mindfulness. Mindfulness helps people adjust negative behaviors and automatic thoughts and regulate positive behaviors related to health and education. In fact, people's interpretation of events and their assessment of the situation plays a key role. Stress and anxiety occur when the situation is assessed as threatening and challenging or dangerous. In addition, people's evaluations of events and situations affect their performance. Mindfulness training affects a person's assessment of the school's position and exam and changes the way a person interprets it, thereby reducing test anxiety in students.

Finally, the results of this study showed that mindfulness education had a positive and significant effect on students' happiness, thus increasing students' happiness. This research finding is consistent with the results of previous studies.^[5,19,20,47,48] Accordingly, people with a high level of awareness can create a constantly dynamic and flexible environment in their lives due to their mastery of time and fear of change. This dynamic and flexible environment prevents negative emotions and psychological distance from friends, and eventually the person will feel more satisfied. The important thing is that people with a high level of awareness pay close attention to the point of view of themselves and others, which keeps the person more active and prevent negative emotions in coping with educational situations; it increases the quality of life of the student and ultimately increases his or her sense of happiness.

This study has had its own limitations, including the fact that no follow-up was performed in this study, and therefore it is not possible to comment on the

effectiveness of mindfulness on the variables studied over time. Furthermore, the data of this research have been collected through self-report questionnaires. These tools may cause individuals to be biased.

Conclusions

In general, it can be said that based on the findings of the present study in problem-oriented, emotion-oriented, avoidant styles, test anxiety, and happiness variables, due to the result of mindfulness skills training, students' related characters have significantly changed. Training mindfulness skills has increased students' problem-oriented coping styles and happiness and has reduced their emotion-oriented, avoidant, and anxiety coping styles.

Based on the results, it is suggested that in schools and generally at centers that deal with adolescents with the help of mindfulness programs, their coping skills can be improved and modified. Hence, more mindfulness-based programs can be used in welfare organizations, day-care centers for adolescents, and counseling and psychotherapy centers to increase the happiness of adolescents with various psychological problems. Finally, mindfulness training method can be used in schools, especially in instructing teachers in order to be implemented in classrooms.

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Conflicts of interest

There are no conflicts of interest.

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