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Original Article

Comparing the Efficacy of Mindfulness-Based Group Training and Emotion Regulation Skills in Externalizing Syndromes in Adolescents with a Tendency for Risky Behaviors

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Abstract

Background and Objective: Mindfulness-based interventions can focus on the present to free people from unpleasant events of the past and worries about the future, thereby reducing their involvement in high-risk behaviors. The present study aimed to assess the effectiveness of mindfulness and emotion regulation training in the reduction of emotion dysregulation in externalization symptoms in adolescents with a tendency for high-risk Behaviors.

Materials and Methods: This experimental study was conducted on 74 at-risk high school adolescents in the 15th district of Tehran in 2019. They were randomly assigned to three groups of mindfulness, emotion regulation, and control groups. With a pre-test and post-test control group design, subjects in the intervention groups underwent sessions of mindfulness and emotion regulation training, while the control group did not receive any intervention. All groups were evaluated in pre-test and post-test using Child Behavior Checklist (CBCL). The data were analyzed in SPSS software (version 18) using multivariate analysis of covariance (MANCOVA) test.

Results: Based on the results, there were no significant mean differences among groups in the pretest. Nonetheless, the scores of externalization syndrome in the subscale of lawless behavior (2η=0.19; P<0.01; F=6.31 (53.2)) and aggressive behavior (18/18 0=2nd; P<0.01; F=5.68 (53.2) significantly reduced in two groups of mindfulness and emotion regulation, compared to those obtained in the control group.

Conclusions: Mindfulness-based group training and emotion regulation could be regarded as useful interventions for at-risk adolescents by emotion regulation and reduction of the possibility of risky behaviors.

Keywords: Adolescents, Emotion regulation, Mindfulness, Risky behaviors

Background

Adolescence as a transition phase between childhood and adulthood [1] is accompanied by minimum interaction with parents and maximum interaction with peers, resulting in less parental supervision [2]. Young people are more exposed to behavioral problems, compared to other people in society. The tendency of young people for risky behaviors and the influence of these behaviors on their health is one of the major problems that have recently attracted the attention of many health sector policymakers in different countries [3]. Risky behaviors refer to a set of behaviors that endanger the safety and life of adolescents, youths, or other people in society [4]. Among these high-risk behaviors which are highly prevalent in young groups, we can refer to smoking, alcohol and substance abuse, as well as risky sexual relations [5], which exert negative impacts on people's behavior in youth and adulthood. Behavioral problems in adolescents can be divided into two categories of clinical syndromes, consisting of externalizing problems (including aggression, delinquency, and conduct disorder) and internalizing problems (including depression, anxiety, and withdrawal) [6]. Studies have demonstrated that both internalizing (depression and anxiety) and externalizing (aggression and delinquency) behavior problems are on the rise [7]. Externalizing risk behaviors which include such behaviors as violence, theft, drug abuse, and drop out of school are often regarded as any behavior that violates social laws, rules, and customs, or the rights of individuals [8].

One of the factors involved in the externalizing symptoms and the tendency of people for risky behaviors and even substance abuse is emotion regulation problem or emotion dysregulation. In this regard, studies have pointed to emotion regulation as a preventive factor against high-risk

behaviors in early adolescence [9]. Emotion regulation is regarded as a process through which individuals consciously and unconsciously modulate their emotions in response to environmental expectations [10]. Based on the related studies, low levels of emotion regulation resulting from the inability to cope effectively with emotions and their management contribute to the onset of externalizing syndromes, including risky sexual behaviors and reckless driving [11-17].

Mindfulness-based interventions can free people from the unpleasant events of the past and worries about the future, thereby reducing their involvement in risky behaviors [18,19]. Eventually, mindfulness exercises can facilitate adaptive and new responses to people, places, and objects that elicit a tendency for behaviors as a habitual and written response [19,20].

As mentioned earlier, the youth of every country are more prone to risky behaviors, as compared to other age groups. The conducted studies have indicated the efficacy of mindfulness therapy and emotion regulation skills in different groups. Although some studies have been carried out on the effectiveness of mindfulness therapy and emotion regulation skills, fewer investigations have compared the two interventions.

Objectives

the present study aimed to compare the efficacy of mindfulness-based group therapy and training of emotion regulation skills in internalizing and externalizing syndromes, as well as self-control of adolescents prone to risky behaviors.

Materials and Methods

The current study was conducted based on a quasi-experimental pretest-posttest control group design. The study population consisted of adolescents prone to risky behaviors in high schools in District 15 of Tehran. Taking into account the nature and type of research, 75 subjects were selected and randomly assigned to three equal groups of mindfulness, emotion regulation, and control. Adolescent Behavioral Problems Scale (BPS) was administered to all three groups before and after the intervention. The experimental groups received eight sessions of mindfulness therapy and emotion regulation, while the control group received no intervention. In the present study, multivariate analysis of covariance (MANCOVA) with an independent variable of group membership, the auxiliary variable of pre-test, and the dependent variable of post-test of subscales of adolescents' behavioral problems scale was employed. The inclusion criteria entailed: willingness to participate in the study, high school education, a high score on the risk-taking scale, the age range of 14-18 years, and male gender. On the other hand, the exclusion criteria were as follows: brain diseases and injuries (e.g., seizures, strokes, and brain concussion), psychiatric diseases and problems, absence of more than three sessions in treatment sessions, taking psychiatric medications, and lack of participation in the post-test.

After the administration of the pre-test on all the three groups, the experimental groups received mindfulness-based intervention and emotion regulation, and post-test scores were collected after the intervention. The treatment was performed in a 50-min session (two sessions per week) in the experimental group as follows.

Eight-week mindfulness training course program

First and second week	Body scan (6 days a week, 45 min a day) Breathing exercise (10 min a day)
Third and fourth week	Proper body scan practice and yoga (one in between and as much as possible 45 min a day, 6 days a week) Thinking breathing exercises in a sitting position for 15-20 min a day
Fifth and sixth week	Sitting and concentration on breathing, sitting for 30-45 min a day alternately with yoga, use of breathing as a practice to control attention Paying attention to physical sensations, sounds, thoughts, and feelings, starting walking meditation
Seventh week	45-min exercise a day (a combination use of sitting, yoga, and body scan techniques), if you were using the tapes, try not to use them this week.
Eighth week	Going back and using the tapes, performing body scan at least twice a week, Continuing yoga and sitting

Iranian Adolescents Risk-taking Scale (IARS)

This questionnaire was designed by Zadeh Mohammadi, Ahmadabadi, and Heidari considering the credible internal and external instruments in the field of risk-taking, such as Adolescents Risk-taking Questionnaire and Youth Risk Behavior Survey, as well as cultural conditions and social constraints of Iranian society [21]. This questionnaire contains 38 items for the assessment of adolescents' vulnerability to seven categories of high-risk behaviors: high-risk driving (n=6), violence (n=5), smoking (n=5), drug use (n=8), alcohol consumption (n=6), sexual relations and sexual behavior (n=4 questions), and orientation to the opposite gender (n=4). The items are rated on a 5-point Likert scale ranging from strongly agree (5) to strongly disagree (1). Items 1-6 pertain to risky driving, items 7-11 belong to violence, items 12-16 pertain to smoking, items 17-24 are related to drug use, items 25-30 measure alcohol consumption, items 31-34 tap into orientation to the opposite sex, and items 35-38 measure sexual risk-

taking [22].

Child Behavior Checklist (CBCL)

This scale was developed by Achenbach and standardized by Hossein Zadeh et al. [23,24]. It is a parent reporting scale for adolescents aged 11-18 years and encompasses two sections of competencies and syndromes. The competencies section consists of four sections of activities, academic performance, social efficiency, and overall competencies [23,25]. Syndrome scale contains withdrawal/depression, somatic complaints, depression/anxiety, social problems, thought problems, attention problems, rule-breaking behavior, aggressive behavior, as well as other behavioral problems that make up a heterogeneous set of different disorders, such as the tendency to the opposite sex, disobedience, not eating, fear of school, nail-biting, nightmares, overeating, overweight, and undereating[22]. The data were analyzed using the MANCOVA test and SPSS software version 18.

Results

The multivariate analysis of variance (MANOVA) was employed to check the homogeneity of the two groups in terms of the variable of externalizing syndrome in the pre-test stage. The results revealed that there was no difference between the control and experimental groups in terms of differences in the initial level and the basis of comparison in the pre-test stage based on the subscales of rule-breaking behavior (P=0.77; F=0.26 (55.2)) and aggressive behavior (P=0.93; F=0.07 (55.2)). The establishment of this assumption pointed to the homogeneity of intervention and control groups in terms of components of externalizing syndrome in the pre-test stage (Table 1).

The MANCOVA was used to assess the differences among adolescents in the control, mindfulness, and emotion regulation groups in terms of externalizing syndrome subscales. The results of Box`s M test confirmed the assumption of homogeneity of the variance-covariance matrix (P=0.87; F=1.55 (F.67681) (6.6)). To examine the assumption of homogeneity of variance, the results of Levene's test demonstrated that the three groups were homogeneous in terms of variance error in the subscales of rule-breaking behavior (P=0.18; F=1.75 (55.2)), and aggressive behavior (P=0.55; F=0.59 (55.2)).

The analysis of MANCOVA revealed that the experimental group had a lower mean score in rule-breaking behavior (F (2.52)= 6.31; P<0.001; $\eta 2$=0.19) and aggressive behavior (F (2.52)=5.7; P<0.001; $\eta 2$=0.18), compared to the control group.

Through examining the effect of the group in each of the subscales, the results of the analysis of covariance by controlling the effect of pretest as a diffraction factor on posttest indicated that there was a statistically significant decrease in the externalizing syndrome scores of the experimental groups after undergoing mindfulness-based therapy and emotion regulation, compared to the control group in the subscales of rule-breaking behavior and aggressive behavior (Table 2 and Figure 1).

Therefore, it can be concluded that mindfulness-based therapy and emotion regulation brought about a reduction in the subscales of externalizing syndrome in the intervention groups.

Base on the results of the post hoc test displayed in Table 3, there was no statistically significant difference in the component of rule-breaking behavior between the two groups of control and emotion regulation. Moreover, no statistically significant difference was detected between mindfulness and emotion regulation interventions, while there was a statistically significant difference between the control and mindfulness groups. In the component of aggressive behavior, there was a statistically significant difference between the control group and the intervention groups of emotion regulation and mindfulness, while there was no statistically significant difference between mindfulness and emotion regulation interventions.

Table 1. Descriptive statistics on the externalizing syndrome components in pre-test and post-test stages

Subscale	Group	N	Pre-test		Post-test	
			Mean	SD	Mean	SD
Rule-breaking behavior	Control	18	4.11	3.98	4.33	3.97
	Emotion Regulation	21	4.95	3.68	3.52	2.37
	Mindfulness	19	4.42	3.51	2.31	2.23
Aggressive behavior	Control	18	7.38	4.07	6.94	4.24
	Emotion Regulation	21	7.85	3.61	5.23	3.31
	Mindfulness	19	7.42	5.55	4.84	4.03

Table 2. Multivariate analysis of variance test for the comparison of groups in subscales of externalizing syndrome

Source of Changes	Subscale	Degree of Freedom (DOF)	F	Significance Level	Chi Eta
Intervention	Rule-breaking Behavior	2-53	6.31	0.01	0.192
	Aggressive Behavior	2-53	5.7	0.01	0.18

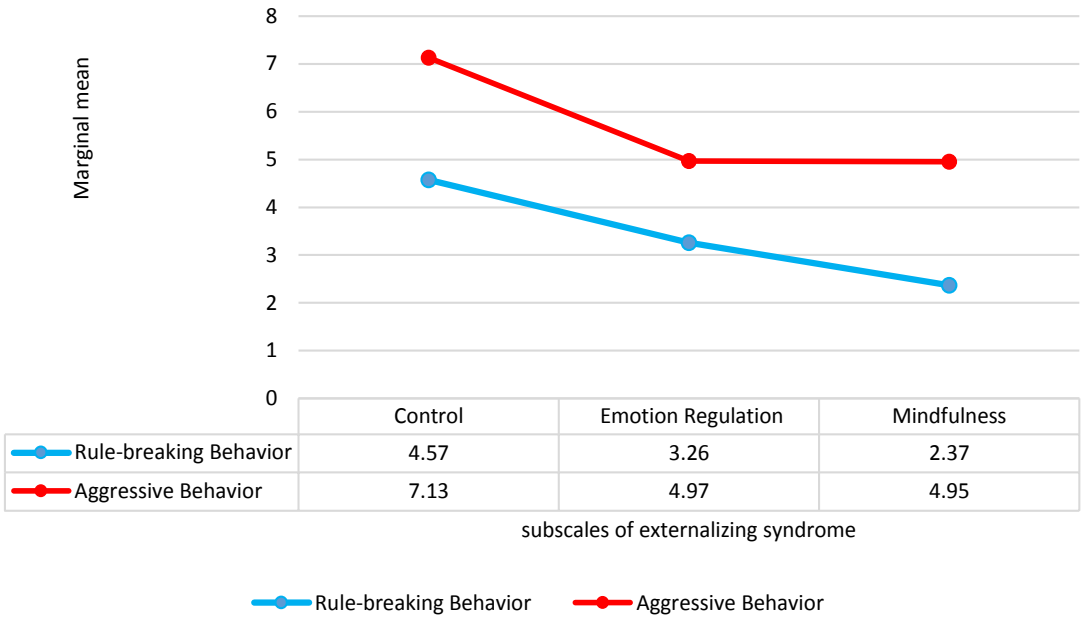

Figure 1. Comparison of Marginal mean in control and experimental groups in subscales of externalization syndrome

Table 3. Paired comparisons of groups in terms of externalizing components

Group		Emotion Regulation	Mindfulness
Rule-breaking Behavior	Control	1.31 (0.61)	2.2 ** (0.62)
	Emotion Regulation		0.88 (0.60)
Aggressive Behavior	Control	2.15* (0.73)	2.18 * (0.74)
	Emotion Regulation		0.028 (0.71)

Note: The values in parentheses are related to the measurement error of comparing the two means.

Discussion

As evidenced by the results of the present study, mindfulness-based therapy and emotion regulation therapy led to a reduction in externalizing syndrome among adolescents. In other words, we can say that the interventions of mindfulness and emotion regulation affected the reduction of externalizing syndrome in adolescents. The comparison of these two interventions demonstrated that both treatments were effective in the reduction of externalizing syndrome. Nonetheless, the group receiving mindfulness therapy exhibited a greater reduction in both components of rule-breaking and aggressive behaviors, compared to the emotion regulation group. However, this difference was not statistically significant. Although there is a dearth of data on the efficacy of emotion regulation in externalizing syndrome, some studies showed the relationship between emotion management problems and risky behaviors. For instance, Lansing et al. indicated that emotion management problems in adolescents with risky behavior are more common and proposed emotion regulation as a preventive intervention. Consistent with the results of the current study, Tull et al. and Sullman et al. highlighted the problems of emotion regulation in risky behavior and reckless driving [9,14,26,27].

The aforementioned results can be attributed to the fact that adolescence is characterized by various biological-neurological and psychological variations. These alterations, particularly in the brain, make adolescents prone to high-risk behaviors and decisions, including substance abuse. The main hypothesis about adolescent brain development is that the adolescent brain has two interacting systems and these two systems grow at different rates. The emotional-motivational system, which includes the subcortical regions, develops in early adolescence. Moreover, the cognitive control system, which includes the cortical areas, especially the prefrontal cortex, develops in late adolescence. Therefore, the behaviors and decisions of adolescents are more influenced by emotional and motivational factors, while cognitive skills, such as response inhibition, which are involved in preventing risky behaviors, grow slowly and have less of an impact on adolescent behavior. In fact, adolescent cognitive control is bottom-up, causing adolescents to respond more quickly and intensely to emotional stimuli. Adolescents' brains are not able to regulate motivational and emotional states as adults do. Some studies have revealed similar patterns of ventral striatum activation in adolescents with risky behaviors and addicted adults. In this domain, training adolescents on emotion regulation skills helps them to create a balance between the

two cognitive and motivational/ emotional systems, resulting in a reduced tendency to aggressive, delinquent, and antisocial behaviors. The present study justifies the decrease in adolescents' scores in two components of externalizing syndrome, namely rule-breaking and aggressive behaviors [28].

Concerning the efficacy of mindfulness therapy, most studies have focused on the effectiveness of this intervention in the groups involved in substance abuse, especially the impact of mindfulness on the reduction of their desire and craving for drug consumption. However, since addictive behaviors and substance use are also a form of risky externalizing behaviors, it is possible to compare the findings of the performed studies and those obtained in the present research. The results of a review study conducted by Garland et al. suggested that mindfulness affected the prevention of risky behaviors, including substance abuse, and even mindfulness training prevents relapse in addicts [19]. The results reported in these studies are in agreement with the findings of the present research. In this regard, it can be argued that mindfulness training can decline reactivity by reducing and modulating the activation of the cingulate cortex and striatum when dealing with underlying environmental conditions [29]. Moreover, mindfulness exercises can make a distinction between negative emotions and the tendency for impulsive and aggressive behavior. Mindfulness training can turn off this relationship so that when a teenager experiences feelings of sadness, fear, or anger, he/she can allow these emotions to arouse without reacting to the emotions. In fact, adolescents prone to risky behaviors participating in mindfulness programs are less likely to be afflicted with negative moods, and this decreased response to negative emotions can lead to a reduction in externalizing syndrome and other aggressive behaviors. Apart from its direct effects, mindfulness also causes a reduction in the tendency for risky behaviors through emotion regulation since in many cases, the risky behaviors are the externalizing form of emotional dysregulation. This can justify the efficacy of mindfulness in the reduction of high-risk behaviors. For example, aggressive behaviors or the tendency for substance abuse are usually the outcomes of emotional dysregulation. In these cases, mindfulness through the regulation and management of emotions can also indirectly reduce the possibility of externalizing syndrome, such as aggressive behavior.

Conclusions

In general, the findings of the present study indicated that mindfulness-based therapy and emotion regulation skills training led to a reduction in externalizing syndrome among adolescents and can be employed as effective interventions for the mitigation of externalizing symptoms in adolescents engaged in risky behaviors, as well as an effective training program in the framework of a preventive program. Among the notable limitations of the present study, we can refer to the research setting which was limited to one district in Tehran. It is suggested that future studies be conducted in a more extended area in Tehran to increase the generalizability of the results.

Compliance with ethical guidelines

All the ethical principles were considered in the present study. The participants were informed about the purpose of the study and the implementation of the stages.

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Authors' contributions

All authors contributed to all sections of the article.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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