Research Paper

Effectiveness of Mindfulness-based Stress Reduction Intervention in Distress Tolerance and Sensation-seeking in Adolescents With a Drug-addicted Parent

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ABSTRACT

Background: Substance abuse of a family member can be effective as an observational model regarding the tendency to substance abuse in other family members. The present study aimed to determine the effectiveness of mindfulness-based stress reduction (MBSR) intervention in distress tolerance and sensation-seeking in adolescents with an addicted parent in Ahvaz.

Methods: This was a pre-test-post-test clinical trial study with a control group. The statistical population of the research comprised all adolescents with an addicted parent in Ahvaz City, Iran, in the school year 2019-2020. In this research, 30 adolescents with an addicted parent were selected through convenience sampling and equally divided into experimental and control groups (n=15). The distress tolerance scale and the sensation-seeking questionnaire were used to collect data. The experimental group underwent MBSR intervention for eight 60-minute sessions. The control group received no intervention. The data were analyzed using analysis of covariance through SPSS software, version 23.

Results: The results suggested that MBSR was effective in increasing distress tolerance and reducing sensation seeking of adolescents with an addicted parent in Ahvaz ($P<0.001$).

Conclusion: Accordingly, this treatment can be used to reduce distress and sensation seeking in adolescents with an addicted parent and decrease their stress.

Keywords: Substance-related disorders, Anxiety, Sensation, Stress, Adolescent

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1. Introduction

Drug addiction is a horrible reality, especially concerning adolescents and young people. It is one of the social, economic, and health problems whose side effects are regarded as a great threat to society causing social depression in disparate fields [1]. Furthermore, its destructive effects can lead to the downfall of a majority of cultural and ethical norms and values. Thus, it poses a serious risk to society's health [2]. In addition to the factor of age, a person's susceptibility to drug addiction can be caused by a variety of factors including depression, self-confidence, independence, illness, hedonism, spiritual poverty, lack of personality growth, despair, as well as familial factors such as drug addiction of a family member and deep emotional gap in the relationship between family members, social factors including school environment, wrong crowd, unemployment, lack of social acceptance, cultural and financial poverty, population growth, unhealthy entertainments, improper residence location, undesirable political and economic factors, cultural invasion, and poverty [3].

In light of these causes, the family as the most crucial social institution is the very first effective source, which plays a vital role in individuals' decisions regarding risky behaviors during adolescence and youth [4, 5]. Bardeen et al. [6] reported that approximately 30% to 45% of adolescents with drug-addicted parents would become substance abusers. Substance abuse of a family member can be effective as an observational model regarding the tendency to substance abuse in the other family members [7, 8]. Thus, low distress tolerance is a crucially important issue in adolescents with a drug-addicted parent. Distress tolerance is defined as an individual's ability to experience and tolerate negative emotional states. It is regarded as an individual difference variable, which refers to the capacity of experiencing and coping with emotional distress [9]. Distress tolerance is characterized as the capacity to experience and tolerate negative psychological states [10].

Distress tolerance is often identified as a self-reported perceived ability of an individual to experience and tolerate negative emotional states or their behavioral ability to continue goal-oriented behaviors when experiencing emotional distress. Furthermore, after the physical and behavioral states, distress tolerance is defined as an individual's ability to tolerate irritating physiological states [11]. Individuals with low distress tolerance make huge mistakes and try to cope with their negative emotions, which results in behavioral disorders. Accordingly, they seek to alleviate their emotional pain by adopting risky behaviors such as substance abuse. This strategy is regarded as an appropriate method, especially for people with low distress tolerance [12, 13]. Heleniak et al. [14], stated that low functional flexibility and distress tolerance in adolescents leads to their susceptibility to addiction.

Psychological variables such as sensation-seeking are numbered among the crucially important factors of the tendency to substance abuse [15]. Sensation-seeking is a personality trait defined as the need to seek different, complex, novel, risky experiences, and sensations [16]. In other words, sensation seeking is a genetic tendency to initiate an enthusiastic activity in response to new stimuli. People with high sensation-seeking are diversity-seeking, impatient, impulsive in gaining rewards, incapable of accepting failure, and generally unmanageable [17].

Reducing the signs and symptoms of the tendency to substance abuse demands the application of prolonged display and therapeutic methods to eliminate specialized skill deficiencies such as mindfulness, interpersonal efficiency, distress tolerance, and emotional regulation. One of the treatments utilized in this research is the MBSR. Moreover, this treatment was initially developed for patients who suffered from chronic pain. However, the reports revealed that employing this method also reduced psychological tensions and stress related to physical symptoms in individuals prone to addiction, cancer patients, and people with other physical diseases [18]. Ma and Fang [19] reported that mindfulness might help reduce adolescents' psychological distress by reducing expressive suppression of emotional experiences. Tang et al. [20] showed that mindfulness-based interventions are effective in reducing psychological symptoms associated with anxiety and depression in adolescents. Skoranski et al. [21] reported that mindfulness may promote better distress tolerance in adolescents at risk for diabetes by changing the way youth perceive and relate to acute stress, rather than changing the physiological stress response.

Mindfulness refers to being aware of all internal and external experiences happening at the moment [22]. It emphasizes three components, i.e., preventing judgment, raising awareness, and focusing on the present. It enables individuals to process their cognitive, physiological, and behavioral activities. Having developed moment-to-moment awareness of thoughts, feelings, and physical states, individuals will learn to control and free themselves from automatic thoughts

[23]. Numerous studies concluded the effectiveness of mindfulness-based cognitive therapy (MBCT) via mediating variables, i.e., self-controlling and sensation seeking. They found that it helped reduce addiction to online games in adolescents, increase distress tolerance, cope with post-traumatic stress disorder (PTSD), enhance distress tolerance, improve the reaction to stress in people, address distress tolerance, control stress, as well as emotional regulation in adolescents in school, and increase mindfulness, distress tolerance, and resilience in adolescents [24-28]. Shameli et al. [24] showed that mindfulness-based cognitive therapy through mediation variables, self-control, and sensation-seeking has effectively reduced internet game addiction in boy adolescents. Campbell et al. [27] reported that participation in the mindfulness program was associated with a significant decline in perceived stress in adolescents.

Adolescents face important situations that affect their future and well-being. Adolescence is one of the most important years in a person's life because people's identification takes place in this period, and in addition, many injuries and disorders are formed in this period. In this period, the rapid spread of drug use is one of the increasing harms that seriously threatens teenagers and is related to the conditions and crises of this period. Drug abuse harms adolescents, their families, and society. Among the most important of these injuries are school failure, job loss, family breakup, violence, and crime. Substance dependence, also known as drug addiction, can take place at all occupations, educational levels, and socio-economic classes and does not target a special individual or class. Taking into account the high prevalence of substance abuse and the difficulty in its treatment, it is necessary to take the required measures to identify the risk factors leading to this problem in various populations, especially in the workplace. In addition, according to studies in this field, few studies have investigated mindfulness programs with the aim of distress tolerance and sensation-seeking among adolescents.

It seems necessary to deal with treatment programs that reduce the tendency to use drugs among teenagers and provide solutions to reduce it. In the present study, distress tolerance and sensation-seeking in adolescents are investigated under the influence of a mindfulness intervention program. Such research at the general level allows us to have a better understanding of how people respond to emotional situations that lead to differences in the risk of substance abuse. Consequently, it may be possible to better identify and treat those at risk. Therefore, based on the above considerations, the present study aimed to determine the role of MBSR in distress tolerance and sensation-seeking in adolescents with an addicted parent.

2. Methods

Participants

The present research was a pretest-posttest clinical trial study with a control group. The statistical population of the research comprised all adolescents with an addicted parent in Ahvaz in the school year 2019-2020. Accordingly, two districts were selected randomly from 4 urban districts in Ahvaz. Afterward, 10 all-boys high schools were selected randomly among the junior high schools in these districts. Having obtained the required permits, the arrangement was made with school authorities, and students with an addicted parent were identified with the guidance of school teachers and counselors. Then, their school records were investigated with the assistance of the teachers and counselors. Given that, the distress tolerance scale was handed over to the students. The inclusion criteria of this research comprised obtaining a below-average score on the distress tolerance scale, obtaining an above-average score in the sensation-seeking questionnaire, absence of severe physical and psychological problems, and handing over a written letter of consent to participate in all therapeutic sessions. The exclusion criteria were missing more than two therapeutic sessions and a change of schools. In total, 30 students meeting the conditions were selected as the statistical samples. In the present study, we included 15 students in each group by use of G*power statistical software (α=0.05; test power of 0.95) [29]. They were randomly placed in the experimental group for MBSR (n=15) and the control group (n=15). The ethical principles practiced in the present research were observing the rights of the participants of the study and respecting their human rights. Having collected the pretest-posttest data, they were analyzed using analysis of covariance (ANCOVA). The following tools were employed to collect the data:

Distress tolerance scale (DTS)

The DTS is a self-report emotion and distress tolerance index developed by Simmons and Gaher [30]. The items of the DTS scale measure distress tolerance based on an individual's ability to tolerate emotional distress tolerance, assess mental distress, pay sufficient attention to negative emotions if occurred, and take regulating measures to alleviate distress. This

Table 1. Overall description of MBSR treatment sessions [33]

Sessions	Plans
1st	Establishing a therapeutic relationship and introducing the group members to each other, specifying the goals and expectations of the treatment, and providing explanations regarding the nature of addiction. The group members then talk about addiction and its effects on various dimensions of their lives. Providing a brief introduction to mindfulness, mindful eating (the raisin exercise), body scan, and training awareness of all daily routine activities.
2nd	Teaching the underlying assumption of mindfulness and the principles of meditation theory, introducing the advantages and positive effects of meditation exercises, teaching the techniques of mindful breathing, meditating while sitting, and exercising recording of pleasant events.
3rd	Teaching about thoughts, mindfully confronting negative automatic thoughts, teaching acceptance instead of making futile efforts, training how to observe thoughts without judgment, teaching the observance of thoughts (thought cascade), and exercising recording of unpleasant events.
4th	Introducing emotion, teaching the difference between feelings and emotions, introducing various positive, negative, and neutral emotions and learning how to identify them, teaching mindful confrontation with negative unpleasant emotions, teaching to find a physical representation of emotions in the body using mindfulness and releasing physical tensions caused by emotions, teaching the technique of observing and identifying emotions, and exercising exploration of emotions in the body.
5th	Teaching stress and its types, introducing the body's stress response cycle, the unpleasant effects of stress on drug addiction and explaining how a relapse to addiction happens by a stressful event, teaching the strategies to cope with stress, the 3-minute breathing space practice, meditation exercises to learn body sensations and surrounding sounds, and the STOP practice for stress management.
6th	Teaching the effects of mindful states on managing and alleviating pain, explaining a 5-step mindfulness model to decrease pain, exploring and identifying unpleasant body sensations such as different types of pain in the body and becoming aware and mindful about them, accepting and dealing with them, and practicing body scan.
7th	Teaching the role of mindfulness in daily behaviors and improving interpersonal relationships, creating mindful states in the interactions with and behaviors toward others, teaching the role of mindful states in identifying and managing states of thoughts, emotions, and unpleasant body sensations that cause a problem in interacting with others, and teaching mindfulness exercises in the daily relationships.
8th	General overview of what was taught during the past sessions, how to extend and expand the state of mindfulness to the various dimensions of personal life and interpersonal relationships, discussion and exchange of ideas between the members of the group regarding the changes that occurred in their lives during the previous sessions, a general summing-up of the entire sessions, and giving the posttest.

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scale constituents 15 items. DTS is scored using a 5-point Likert scale from one to five. High scores indicate high distress tolerance. The reported Cronbach alpha for the total instrument is 0.82. Azizi [31] reported that the Persian version of DTS is a valid and reliable scale and is suitable for use to assess distress tolerance.

Sensation seeking questionnaire (SSQ)

The Zuckerman SSQ comprises 40 two-component items. The participants were required to select one of the two components of each item. In case their answer corresponds to the scoring keys, they will receive one score per response. After counting the scores of the participants, which range from zero to 40, their sensation-seeking scores were obtained. A higher score indicates high levels of sensation seeking, and lower scores indicate mild levels of sensation seeking. Soltani et al. [32] reported SSQ's reliability equal to 0.74 based on Cronbach's alpha coefficient. In addition, the authors [32] confirmed the validity of the Persian version of SSQ. In this study, the Cronbach alpha coefficient was 0.82 for the questionnaire.

Procedure

The intervention program consisted of eight 60-minute sessions of mindfulness-based stress reduction (MBSR). Therapeutic intervention sessions were conducted once a week following Kabat-Zinn's [33] handbook. MBSR intervention sessions were held in one of Ahvaz's counseling centers by a psychotherapist who had completed specialized courses and workshops. During this time, the control group was placed on the waiting list and did not receive any intervention. After the completion of the training sessions on the experimental group, intensive therapeutic sessions were held for the control group to observe the ethical principles. Table 1 shows a summary of MBSR treatments

Statistical analyses

Data were analyzed by descriptive and inferential statistics, such as mean, standard deviation, and ANCOVA. The Kolmogorov-Smirnov test was used to determine the normal distribution of the data. Moreover, Levene's test was employed to assess the assumption of homogeneity of variance. Finally, data were analyzed using SPSS software, version 23.

3. Results

The participants included 30 adolescents with an addicted parent, with Mean±SD aged 14.72±2.44 years old. The demographic variables of the participants are shown in Table 2. Table 3 shows the Mean±SD (pretest and posttest) of the data.

The hypotheses were examined to ensure that the data of the present research were able to estimate the hypotheses of the ANCOVA, before analyzing the data pertinent to the hypotheses. Thus, the normality of the data was demonstrated through the lack of significance of the Z Kolmogorov-Smirnov test, which follows the normal distribution regarding the distress tolerance variable (Z=0.111, P=0.200) and the sensation-seeking variable (Z=0.240, P=0.087). Furthermore, Levene's test was employed to assess the assumption of homogeneity of variance in the two groups (similarity of variance between two experimental and control groups). Accordingly, the values for the distress tolerance variable were (F=1.006, P=0.269) and for the sensation-seeking variable were (F=0.322, P=0.607). The results of Box test were (Box=1.694, P=0.660, F=0.532). In addition, ANCOVA was used to examine the assumption of homogeneity of regression slope, and the obtained values were (F=1.106, P=0.345) for distress tolerance and (F=1.705, P=0.196) for sensation-seeking variable.

Table 2. Demographic characteristics of the participants

Groups	Mean±SD	Gender of Addicted Parent		
	Age(y)	No. (%)		
		Mother	Father	Both
MBSR	14.49±2.68	4(26.67)	8(53.33)	3(20.00)
Control	15.23±2.14	4(26.67)	10(66.67)	1(6.66)

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Table 3. Mean±SD of variables in experimental and control groups

Variables	Phases	Mean±SD	
		MBSR	Control
Distress tolerance	Pre-test	31.92±4.68	30.70±5.09
	Post-test	49.55±5.40	31.18±4.77
Sensation-seeking	Pre-test	28.82±4.72	29.11±4.18
	Post-test	16.38±3.22	28.50±4.68

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SD: Standard deviation; MBSR: Mindfulness-based stress reduction.

Table 4. Results of ANCOVA on the posttest scores of the variables

Variables	SS	df	MS	F	P	η2	Power
Distress tolerance	2724.46	1	2724.46	31.93	0.001	0.47	1.00
Sensation-seeking	1185.92	1	1185.92	39.62	0.001	0.52	1.00

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SS: Sum of squares; MS: Mean square; df: Degrees of freedom; F: F-statistic; P: P-value; η^2: Eta-squared

The multivariable analysis of variance was used to compare the experimental and control groups' posttest scores, after controlling for the effect of pretests, to determine the impact of the intervention on distress tolerance and sensation seeking in adolescents with a drug-addicted parent in Ahvaz. The results in Table 3 show that these groups significantly differed in at least one dependent variable (P<0.001).

Table 4 presents the results of ANCOVA for the posttest scores regarding the dependent variables. The results in Table 4 revealed that there was a significant difference in the variables of distress tolerance and sensation-seeking between the experimental and control groups (P<0.001). Consequently, the MBSR intervention program was effective in reducing distress tolerance and sensation-seeking in the posttest.

4. Discussion

This study aimed to determine the role of MBSR in distress tolerance and sensation-seeking in adolescents with an addicted parent in Ahvaz. The first finding suggested that MBSR was influential in increasing distress tolerance in the post-test stage. This finding was consistent with the findings of the previous studies [27, 28]. It signifies that adolescents with drug-addicted parents frequently flashback to the primary and painful emotional and affective states they experienced when their parents searched for drugs, which reduces their distress tolerance. Teaching mindfulness skills encourages these people to observe and accept their emotional experiences using mindfulness techniques without attempting to make any changes. Facing negative emotions in this way can probably reduce impulsive reactions to stress [25].

Therefore, individuals are encouraged to observe their emotions as transient events that do not require displaying any maladjusted behaviors and reactions. This generalized view toward emotions helps prevent experiencing emotional reactions again. When an individual practices mindfulness in their daily routine, it enables them to recognize when they are in a normal state and provides them with an opportunity to live in the present. Consequently, they can break the chain of events that lead to unpleasant and stressful feelings. Mindfulness meditation enables the individual to provide a creative response to the situation in the present moment and become free of involuntary reactions. Body scanning exercises by directly sensing the body increase the sensitivity to receive the messages of the body and reduce the sensitivity to receive mental distress [28].

Moreover, mindfulness-based methods use meditation techniques such as mindful breathing and increased awareness of the situation and the self to deal with and survive during a time of crisis. These methods also enable the individual to tolerate physical and emotional pain in the long term and the short term. Teaching mindfulness skills helps to realize that everything happens in the present. Thus, it enables individuals to receive events less painful than they are at the present moment. This signifies that after MBST training, an individual increases a meta-emotional structure in themselves known as distress tolerance [25]. Therefore, they pay attention to it, assess it, and when they realize they cannot change the situation, they accept and tolerate it. Given that, they can regulate their emotions, especially the force resulting from the inclination to act to immediately avoid or weaken the experience, and thus do not suffer functional disintegration.

The results found that MBSR was effective in reducing sensation-seeking in adolescents with a drug-addicted parent in Ahvaz. This finding was consistent with the findings of the previous studies [24]. Thus, it can be argued that a lower ability to regulate emotions, sensation-seeking, and a positive attitude to substance abuse are among the risk factors of substance abuse and mutually influence each other. Reducing the severity of perceived risks of addiction can affect the subsequent outcomes such as the tendency to substance abuse and becoming a drug addict. Adolescents with a drug-addicted parent frequently flashback to the primary and painful emotional and affective states they experienced when their parents were searched for drugs, and this increases their sensation seeking. Research has shown that individuals can affect how they display these emotions. This ability is called mindfulness. Mindfulness is a basic principle to start, assess, and organize well-adjusted behaviors, and prevent negative emotions and maladjusted behaviors. It is characterized as the processes through which individuals modify their emotions to respond to conscious and subconscious environmental expectations. Failure to regulate emotions is called emotion dysregulation. Emotion dysregulation is defined as maladjusted methods for responding to emotions. Numerous physiological symptoms and disorders can be related to emotion dysregulation including pain, smoking, and diagnostic signs of emotion dysregulation and internalizing disorders such as depression and anxiety [6]. Taking into account that MBSR improves and modifies the cognitive emotion regulation strategies in individuals through increasing positive mood, attention, consciousness, and acceptance of the emotions individuals experience, the application of MBSR intervention is justified.

The research population was limited to teenagers in Ahvaz city; therefore, the results should be extrapolated to other populations with caution. Another limitation of the present study was the absence of a follow-up period to check the continuity of the effects of the treatment method. Conducting similar studies in other communities as well as conducting a follow-up period are the most important suggestions for future studies.

5. Conclusion

MBSR employs meditation techniques to train individuals such that when they face thoughts bearing negative psychological symptoms, they can change their relationship with them and modify their excitement symptoms. According to the results of this research, counseling centers are recommended to perform MBSR on adolescents. In addition, the results can be generalized to other groups by researching different cultures and societies. Taking into account that the parent and relationship with male children can affect the results, it is recommended to control the sex of drug-addicted parents in future studies.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Ethics Committee of Ahvaz Branch, Islamic Azad University (Code: IR.IAU.AHVAZ.REC.1399.024). Clinical Trial Information: IRCT20201007048963N1

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflicts of interest.

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