

# Effects of Mindful Parenting Training on Clinical Symptoms in Children with Attention Deficit Hyperactivity Disorder and Parenting Stress: Randomized Controlled Trial

Mahdiyeh Behbahani<sup>1</sup>, MA;  
Fatemeh Zargar<sup>2</sup>, MD;  
Fatemeh Assarian<sup>3</sup>, MD;  
Hosein Akbari<sup>4</sup>, PhD

<sup>1</sup>Department of Clinical Psychology,  
Faculty of Medicine, Kashan University  
of Medical Sciences, Kashan, Iran;

<sup>2</sup>Department of Psychiatry and  
Behavioral Sciences Research Center,  
Isfahan University of Medical Sciences,  
Isfahan, Iran;

<sup>3</sup>Department of Psychiatry, Faculty of  
Medicine, Kashan University of Medical  
Sciences, Kashan, Iran;

<sup>4</sup>Department of Biostatistics and Public  
Health, Faculty of Health, Kashan  
University of Medical Sciences, Kashan,  
Iran

## Correspondence:

Fatemeh Zargar, MD;  
Department of Psychiatry, Noor Hospital,  
Ostandari Ave., Isfahan, Iran

Tel: +98 913 2083174

Email: [f.zargar@med.mui.ac.ir](mailto:f.zargar@med.mui.ac.ir)

Received: 29 December 2016

Revised: 26 March 2017

Accepted: 14 May 2017

## What's Known

- In previous interventions for parenting such as cognitive behavioral therapy, parents of children with attention deficit hyperactivity disorder (ADHD) learned parenting skills; however, when they were under stress or had their own psychopathology, they failed to perform those skills and were likely to feel frustrated.
- Mindful parenting has none of the limitations of the previous methods.

## What's New

- Research on the effectiveness of mindful parenting training is still ongoing. This study is the first study on mindful parenting in Iran. Previous studies on ADHD investigated symptom alleviation without focusing on the basic mechanisms of mindful parenting.

## Abstract

**Background:** Children with attention deficit hyperactivity disorder (ADHD) are at risk of impairment in multiple domains. This study aimed to investigate the effectiveness of mindful parenting training in reducing clinical symptoms in children with ADHD and parenting stress of their parents.

**Methods:** This randomized clinical trial was conducted on 2 groups (experimental and control) in 3 phases (pretest, posttest, and 8 weeks' follow-up). Sixty children with ADHD, who had been referred by the child psychiatrist in the Iranian city of Kashan in the second half of the year 2016, were selected along with their mothers. The mothers were assigned to one of the 2 groups via permuted blocked randomization. The mothers completed the parenting stress index–short form (PSI–SF 36) and the Swanson, Nolan, and Pelham Parent and Teacher rating scale (SNAP-IV). All the children in both groups received pharmacotherapy with either risperidone or Ritalin. The intervention group received 8 sessions (1 session each week, each session lasting 90 minutes) of mindful parenting training based on the Kabat-Zinn protocol. The data were analyzed using SPSS, version 20, via the *t* test,  $\chi^2$  test, repeated measures analysis of variance, and nonparametric Friedman test.

**Results:** This study showed a reduction in parenting stress, negative parent-child interactions, and children's problematic characteristics in the mindful parenting training group compared with the control group in the posttest and follow-up. Our results also demonstrated a significant improvement in ADHD symptoms in the experimental group by comparison with the control group in the posttest and follow-up.

**Conclusion:** Mindful parenting training was effective in reducing parenting stress and ADHD symptoms in our intervention group.

**Trial Registration Number:** IRCT2016021026505N1

Please cite this article as: Behbahani M, Zargar F, Assarian F, Akbari H. Effects of Mindful Parenting Training on Clinical Symptoms in Children with Attention Deficit Hyperactivity Disorder and Parenting Stress: Randomized Controlled Trial. *Iran J Med Sci*. 2018;43(6):596-604.

**Keywords** • Mindfulness • Attention deficit disorder with hyperactivity • Parenting • Stress • Physiological

## Introduction

Attention deficit hyperactivity disorder (ADHD) is a persistent pattern of inattention and hyperactivity that creates disturbance in the development or function. There are 3 types of ADHD:

inattentive, hyperactive, and impulsive. The inattentive type often fails to give close attention to details or makes careless mistakes, while the hyperactive type often acts as if operated by engine.<sup>1</sup> The hyperactive type has an onset in early childhood and typically continues to adolescence and adulthood.<sup>2,3</sup> ADHD has a worldwide prevalence ranging from 5% to 7% of all school-age children.<sup>4</sup>

Parents of children with ADHD report higher levels of stress associated with the parenting role (greater feeling of role inadequacy) and have poorer psychological well-being than parents of children without this disorder.<sup>5</sup> Parenting stress can be described as negative feelings that a parent has toward the self or his/her children.<sup>6</sup> The relationship between child behavioral problems and parenting stress is bidirectional.<sup>7</sup> Children with ADHD exhibit the pattern of noncompliance, negative parent-child interactions, and reduction in adaptability.<sup>7,8</sup> Additionally, they have more destructive behaviors. Their parents may face more challenges and stresses in managing their difficult behavior<sup>7</sup> and, as a result, tend to use over-reactive and punitive methods.<sup>9,10</sup> In this vicious circle, children exhibit more disapproval and more negative behaviors than other children.<sup>11</sup> Therefore, their parents experience more stress due to having the feeling of being an inefficient parent.<sup>7,8</sup> Further, children with ADHD are prone to experience more problems from familial and psychological aspects. For example, poor management of the behaviors and family relationships of children with ADHD increases the risk of other comorbid psychopathologic problems such as opposition, conduct, antisocial disorder, and mood and anxiety disorders in children as well as mood and anxiety disorders in their parents.<sup>12</sup> ADHD is associated with serious impairments in school performance<sup>2,8</sup> such as lower education attainment.<sup>10</sup> These impairments in academic performance continue into adolescence and adulthood and lead to poorer work performance.<sup>10,13</sup> This group of children are more likely to exhibit substance abuse.<sup>1</sup> It is, therefore, essential to introduce proper treatments to reduce these problems.

Both medication and psychotherapy (e.g. cognitive behavioral therapy and behavioral therapy) are presented for this disorder. Medication works only in the short term and is often associated with side effects.<sup>9,14</sup> Psychotherapy has been shown to be effective in the treatment of ADHD, but it has several limitations.<sup>9,14</sup> First, in cognitive behavioral therapy and behavioral therapy, the generalization of the learnt skills is often inadequate. Parents of children with ADHD learn

parenting skills through behavioral therapy or cognitive behavioral therapy, but when they are under stress or have their own psychopathology, they may not be able to perform those skills and as such may feel frustrated.<sup>15</sup>

In recent decades, mindfulness-based therapies (mindful parenting) in parenting have been introduced and they do not suffer from the limitations of previous methods. Mindful parenting was defined by Kabat-Zinn in 1997.<sup>9</sup> Mindful parenting is one of the modern approaches to childrearing which reduces parents' reactivity to children's behaviors.<sup>16</sup> It also affects family functions through reducing parenting stress and focusing on the psychological pathology of parent-child.<sup>9,17</sup> In addition, it exerts its effects via the following 5 processes: attentive listening, nonjudgmental acceptance of oneself and one's children, awareness of emotions and self-regulation in childrearing relationships, and compassion toward oneself and one's children.<sup>18</sup>

Research into the effectiveness of mindful parenting training is in its early stages, and there is, thus, a paucity of data in this regard. Accordingly, we sought to investigate the effects of mindful parenting training on parenting stress and ADHD symptoms.

## Materials and Methods

### *Parenting Stress Index–Short form (PSI–SF)*

Parents completed the Iranian version of the PSI–SF (Abidin 1995) for the assessment of the source and degree of stress and the level of stress associated with caring for their children through items devised to evaluate lack of social support, depression, and feeling of incompetence in the parenting role.<sup>7</sup> The PSI comprises 36 items rated on a 1 (strongly disagree) to 5 (strongly agree) scale. It contains 3 subscales (each with 12 questions): parental distress, stress related to the parent-child interactions, stress related to the difficult child, and a total stress score to provide a global marker of parental coping. The validity of each subscale is 0.80, 0.84, and 0.80, respectively, and 0.90 for the total score. The test-retest reliability is between 0.71 and 0.82.<sup>19</sup>

### *Swanson, Nolan, and Pelham Parent and Teacher Rating Scale (SNAP-IV)*

Parents completed the Iranian version of the SNAP-IV (diagnosis and classification of ADHD disorder) for children aged between 7 and 12. The SNAP-IV contains 18 items rated on a 0 (never/not at all) to 3 (often/very much) scale. The subscales assess attention deficit (ADD, 9 questions, cutoff point=1.45), hyperactivity disorder (HDD, 9 questions, cutoff point=1.9),

and attention deficit hyperactivity disorder (ADHD, 18 questions, cutoff point=1.57). The test-retest reliability coefficient is 0.82, with Cronbach's alpha of 0.90 and half coefficient of 0.76.<sup>20</sup>

### *Mindful Parenting Training Protocol*

The intervention consisted of 8 weekly sessions of mindful parenting training based on the Kabat-Zinn protocol.<sup>9</sup> At the beginning of the course, the parents received a CD with mindfulness exercise for home practice. The objectives of the mindful parenting training were to teach the parents to 1) be deliberately and fully present in *here and now* with their children in a nonjudgmental way, 2) take care of themselves as an important basis for parenting, 3) accept the difficulties of their children, and 4) respond rather than react to the difficult behaviors of their children.<sup>21</sup> The overall contents of the sessions are depicted in table 1.

### *Patients*

Children with ADHD aged between 7 and 12 were introduced to an academic clinic of mental health care in Kargarnejad Hospital in Kashan by school psychologists, general practitioners,

and psychiatrists. Sixty mother-child dyads were selected based on our inclusion criteria. Four mother-child dyads were excluded from the study. Figure 1 shows a consolidated standards of reporting trials (CONSORT) diagram depicting the flow of the study participants. The inclusion criteria for children were comprised of having ADHD according to a psychiatrist, age between 7 and 12 years, and receiving regular pharmacotherapy (risperidone or Ritalin), and for their mothers having a minimum education level of high school diploma. The exclusion criteria comprised intellectual disability in the mother-child dyad, comorbid developmental disorders (e.g. autism), major mood disorder (bipolar) or psychosis, receiving pharmacotherapy irregularly among the children, and absence of more than 2 therapeutic sessions for the experimental group.

### **Participants and Methods**

The current study was a randomized clinical trial with a 2-month follow-up. The Research Ethics Committee of Kashan University of Medical Sciences approved this study (IRCT #IRCT2016021026505N1). Sixty children with

**Table 1:** Contents of the training sessions based on the Kabat-Zinn protocol

Sessions	Contents of the training sessions
Session 1	Automatic Parenting Getting started, meditation, introducing oneself, stepping out of automatic pilot: eating a raisin mindfully, morning stress exercise (rational for the mindful parenting course), and body scan training
Session 2	Beginner's Mind Parenting Body scan+inquiry, observation of one's child: child as raisin exercise, morning stress from the perspective of a friend, mindful seeing, gorilla in the midst, and gratitude practice
Session 3	Reconnecting with Our Body as a Parent Sitting meditation: breathing and physical sensations, savoring pleasant moments, 3-minute breathing space, yoga (lying and sitting), watching the body during parenting stress, bringing kindness to oneself
Session 4	Responding versus Reacting to Parenting Stress Adding meditation to sounds and thoughts; reading Koan (illustrating the "train of thoughts" in which parents can get caught up); discussing stressful parenting event in dyads; grasping and pushing away; demonstrating fight, flight, freeze, and dance; and 3-minute breathing space under stress. Imagination: awareness and acceptance of stress using the breathing space and doors, halfway evaluation, and standing yoga
Session 5	Parenting Patterns and Schemas Adding meditation to emotions, introducing reactive parenting and schema modes, 3-minute breathing space, walking meditation inside, and holding ones' emotions
Session 6	Conflict and Parenting Introducing choice-less awareness, walking meditation outside, perspective taking, reading a poem: "Autobiography in Five Chapters"
Session 7	Love and Limits: Cultivating Compassion Loving-kindness meditation, review of mindfulness day, What do I need?, limits, role-play: limits, review of home practice, and "The Two Wolves"
Session 8	Are We There Yet? A Mindful Path Body scan+inquiry, review of home practice, gratitude practice, meditation on what has been learned, meditation plan for the next 8 weeks, process descriptions with objects, reading some suggestions for everyday mindful parenting, and closing meditation
Follow-Up	Each Time, Beginning Anew Sitting meditation, sharing the experience of the last 8 weeks (in pairs), group sharing of the last 8 weeks, mountain meditation for parents, stone meditation, wishing well, and individual evaluation

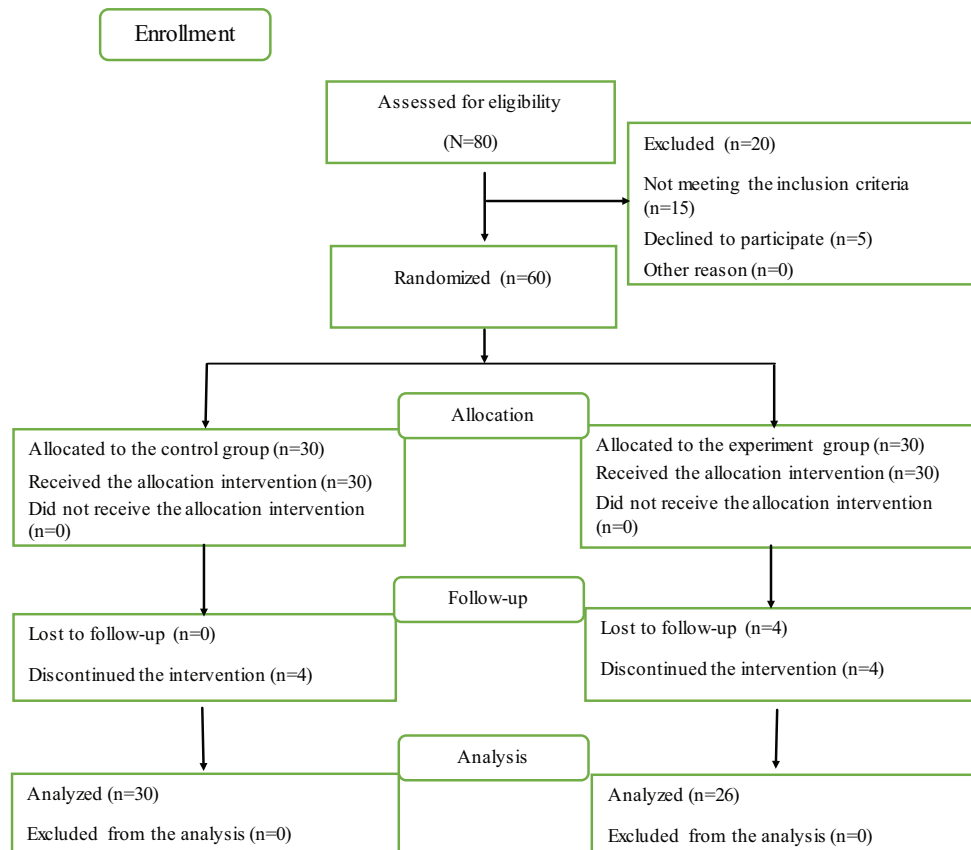


Figure 1: CONSORT diagram shows the flow of participants through each stage of a randomized trial.

ADHD, who had been referred by the child psychiatrist at Kargarnajad Hospital in Kashan, Iran, in the second half of the year 2016, were selected along with their mothers.

After granting informed consent, the mothers were assigned to the 2 groups of experimental and control via permuted blocked randomization. The mothers completed the pretest, which encompassed the PSI-SF 36 and the SNAP-IV. All the children in both groups (i.e. experimental and control) received pharmacotherapy with risperidone or Ritalin. The intervention group received 8 sessions (1 session each week, each session lasting 90 minutes) of mindful parenting training based on the Kabat-Zinn protocol.<sup>9</sup> The overall contents of the sessions are illustrated in table 1. Additional sessions were held for the participants who missed 1 or 2 sessions. Following the intervention and 2 months after the last session, the 2 groups completed the study questionnaires.

#### Statistical Analysis

The data were analyzed using SPSS, version 20. The demographic characteristic data were analyzed using the *t* test to compare significant differences between the ages. The  $\chi^2$  test was employed to compare significant

differences between other variables such as grades, sex, and education levels of the mothers and fathers. The mean scores of the participants in the PSI-SF 36 (parental distress, parent-child interactions, children's problematic characteristics, and total stress) and the SNAP-IV (hyperactive, ADD, and ADHD) were compared using the repeated measures analysis of variance (ANOVA) and the nonparametric Friedman test for several dependent groups. A *P* value less than 0.05 was considered statistically significant in all the tests.

#### Results

The study population consisted of 56 subjects, comprising 30 individuals in the control group and 26 in the intervention group. Four subjects were excluded from each group because they missed more than 2 sessions or did not complete the questionnaires. Table 2 shows the demographic characteristics of the subjects. The *t* test and the  $\chi^2$  test yielded no significant differences in terms of the demographic variables between the groups.

Table 3 provides the mean scores and the standard deviations of the dependent variables in 3 phases (i.e., pretest, posttest, and 8 weeks'

**Table 2:** Demographic characteristics of the parents and children

Variables		Control Group	Intervention Group	P value
Age	< 9 y	21 (70)	19 (73.1)	0.79 <sup>a</sup>
	>10 y	9 (30)	7 (26.9)	
$\chi^2 \pm SD$		8.65 $\pm$ 1.64	8.73 $\pm$ 1.65	0.85 <sup>a</sup>
Sex	Girl	11 (36.7)	8 (30.8)	0.64 <sup>b</sup>
	Boy	19 (63.3)	18 (69.2)	
Mother's education	Diploma	21 (70)	18 (69.2)	0.96 <sup>b</sup>
	Bachelor	8 (26.7)	6 (23.1)	
	Master	1 (3.3)	2 (7.7)	
Father's education	Diploma	25 (83.3)	18 (69.2)	0.52 <sup>b</sup>
	Bachelor	5 (16.7)	8 (30.8)	
Grade	First grade	11 (36.7)	9 (34.6)	0.97 <sup>a</sup>
	Second grade	7 (23.3)	7 (26.9)	
	Third grade	4 (13.3)	2 (7.7)	
	Fourth grade	5 (16.7)	5 (19.2)	
	Fifth grade	3 (10)	3 (11.5)	
$\chi^2 \pm SD$		2.46 $\pm$ 1.44	2.43 $\pm$ 1.47	0.94 <sup>a</sup>

Data are presented as mean $\pm$ SD or NO (%). <sup>a</sup> t test; <sup>b</sup>  $\chi^2$  test

**Table 3:** Variations in the scores of attention deficit hyperactivity disorder at pretest, posttest, and 8-weeks' follow-up in the 2 groups

Group Scales		Pretest			Posttest			Follow-Up		
		Control	Intervention	P value	Control	Intervention	P value	Control	Intervention	P value
Attention deficit	mild	5 (16.7)	7 (26.9)	0.69	2 (6.7)	5 (19.2)	0.001	1 (3.3)	11 (42.3)	<0.001
	moderate	5 (16.7)	4 (15.4)		1 (3.3)	9 (34.6)		2 (6.7)	4 (15.4)	
	severe	20 (66.7)	15 (57.7)		27 (90.0)	12 (46.2)		27 (90.0)	11 (42.3)	
Hyperactivity	mild	5 (16.7)	5 (19.2)	0.86	5 (16.7)	12 (46.2)	0.04	3 (10.3)	16 (61.5)	<0.001
	moderate	8 (26.7)	5 (19.2)		8 (26.7)	6 (23.1)		4 (13.3)	3 (11.5)	
	severe	17 (56.7)	16 (61.5)		17 (56.7)	8 (30.8)		23 (76.6)	7 (26.9)	
Attention deficit hyperactivity	mild	3 (10)	2 (7.7)	0.68	3 (10.0)	9 (34.6)	0.04	1 (3.3)	12 (46.2)	<0.001
	moderate	5 (16.7)	7 (26.9)		5 (16.7)	6 (23.1)		1 (3.3)	4 (15.4)	
	severe	22 (73.3)	17 (65.4)		22 (73.3)	11 (42.3)		28 (93.3)	10 (38.5)	

Data are presented as frequencies and frequency percentages

follow-up). As is demonstrated in this table, there were no significant differences between the 2 groups and the 3 subscales with respect to ADHD intensity ( $P < 0.69$ ). However, there were significant differences between the 2 groups following intervention ( $P < 0.05$ ). This shows the interference effect. Furthermore, the difference between the 2 groups was significant in the follow-up ( $P < 0.001$ ).

Table 4 presents our variance analyses with continual measurements. This table illustrates the changes in the ADHD scores and parenting stress according to time, studied groups, and confounding factors. The results of the Friedman test showed that the 2 study groups in both the tools and their subscales exhibited significant changes over time. The significance of the P value is concerned with the interaction of time\*group in table 4, which shows the

difference between the 2 groups of interference and treatment over time and interference effects. As is depicted in table 4, time and group effects were significant in all the subscales except in the subscales of the parents' disorders. This shows the effectiveness of interference on differences between the means of the groups. In other words, stress reduction was seen in both experimental and interference groups, but this was far more evident in the latter group ( $P < 0.001$ ).

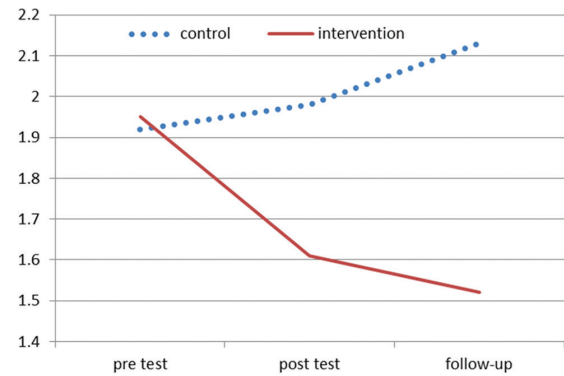
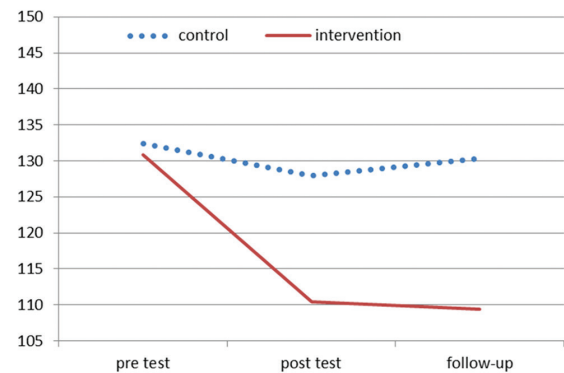
Figure 2 shows the mean ADHD scores at pretest, posttest, and 8-weeks' follow-up in the 2 groups. Figure 3 illustrates the parenting stress scores in the 3 stages. These cases showed the interference effect immediately after the interference and 2 months afterward. It should be mentioned that figure 3 is not compatible with the table because there was a significant difference between the pre-control and post-control groups.



**Table 4:** Comparison of ADHD and parenting stress at pretest, posttest, and 8-weeks' follow-up between the 2 study groups

Variables	Intervention Group					P value <sup>b</sup>				
	Control Group		Intervention Group		Time	Time * group	Group	Time	Time * group	Group
	Pretest	Posttest	Follow-up	P value <sup>a</sup>						
HDD	2.03±0.64	2.09±0.58	2.21±0.54	<0.001	2.14±0.57	1.63±0.65	1.52±0.63	0.27	<0.001	0.106
ADD	1.80±0.64	1.87±0.70	2.04±0.58	<0.001	1.77±0.66	1.58±0.70	1.52±0.74	0.27	<0.001	0.02
ADHD	1.92±0.58	1.98±0.59	2.13±0.52	<0.001	1.95±0.55	1.61±0.60	1.52±0.63	0.19	<0.001	0.034
Parental distress	49.10±5.06	42.26±8.61	43.16±8.1	<0.001	47.76±4.71	37.42±6.11	37.07±7.13	0.68	0.045	0.009
Parent-child interactions	37.86±5.4	38.80±5.4	39.40±5.3	<0.008	37.69±4.84	33.19±5.81	32.26±5.42	0.98	<0.001	0.002
Child's problematic characteristics	45.46±7.7	46.96±7.4	47.06±7.3	<0.001	45.34±8.13	439.80±8.3	38.96±7.23	0.51	<0.001	0.012
Total stress	132.4±11.6	128.0±17.6	130.3±18.0	<0.003	130.8±14.1	110.4±18.5	109.4±18.9	0.86	<0.001	0.002

Data are presented as mean±SD. a: nonparametric Friedman test for several dependent groups; b: repeated measures analysis; HDD, Hyperactivity disorder; ADD, Attention deficit disorder; ADHD, Attention deficit hyperactivity disorder

**Figure 2:** Mean ADHD scores at pretest, posttest, and 8-weeks' follow-up in the 2 study groups.**Figure 3:** Mean parenting stress scores at pretest, posttest, and 8-weeks' follow-up in the 2 study groups.

Since the variance within subject was small, the changes in the control group were meaningful and the Freedman test was used to compare 3 dependent groups (i.e. pretest, posttest, and follow-up). In fact, this test showed only the within-subject changes. However, multivariable check and analysis of variance with repeated measures ANOVA, used in table 4, showed both within-subject effects (time) and inter-subject effects.

## Discussion

ADHD is one of the commonest causes of the referral of children to psychologists.<sup>1</sup> Studies have shown that effective childrearing and healthy family relationships have significant roles in minimizing the effects of ADHD.<sup>7</sup> Mindful parenting training is among the newest approaches to the rearing of children with ADHD. The present study was the first in its kind in Iran to assess the effectiveness of mindful parenting training in reducing parenting stress and clinical symptoms among children with ADHD.

The results of a meta-analysis study on parenting stress among parents of children with ADHD illustrated that these parents experienced

greater levels of stress than the parents of normal children.<sup>5</sup> Another study revealed that the most important mechanism of action of mindful parenting was the control of psychopathology and parenting stress in the child-parent relationship.<sup>16,17</sup>

In our study, the parents reported a significant reduction in negative parent-child interactions and parenting stress after participation in mindful parenting training. By way of explanation, the present study showed that mindful parenting training through clinical techniques was able to improve parent-child relationships, prevent the parents' extreme reactions to their children's abnormal behaviors, reduce child-parent challenges, and thereby lessen parenting stress. This is in line with the findings of another study that indicated the effectiveness of mindful parenting in reducing parenting stress.<sup>21,22</sup>

Emotional awareness is defined as practicing moment-to-moment awareness.<sup>17</sup> Alternatively stated, through mindfulness, parents become conscious of their own moment-to-moment emotion status, without trying to change or prevent it.<sup>16</sup> Through self-regulation in the parenting relationship<sup>23</sup> via bringing to bear mindful skills (e.g. the 3-minute breathing space meditation)<sup>18</sup> for anger management and exhibition of positive and negative emotions,<sup>17</sup> parents can control their stress or their own psychopathology interaction with children who have behavioral problems. Put differently, mindfulness may enable parents to improve their performance indirectly through reducing emotion prevention and increasing self-regulation.<sup>18,23</sup> Also, mindful parenting training reduces biased attention for the negative aspects of their children and as parents by nonjudgmental acceptance of themselves and their child<sup>23</sup> through developing an open and receptive stance in the parenting context.<sup>23</sup> Consequently, mindful parenting training can augment parent-child interactions and alleviate parenting stress.

Previous research has shown that parenting stress prompts parents to react strongly against the negative behaviors of their ADHD-afflicted children and, thus, exacerbates the clinical symptoms of the disorder.<sup>7,10</sup> Children with ADHD symptoms have behavioral problems, and their parents may selectively pay attention to their negative and positive behaviors.<sup>9</sup> Accordingly, they may act in a punishing and impulsive way, which might directly increase the children's appositional behaviors. This kind of parenting and process can increasingly perpetuate negative transactional interactions and children's behavioral problems.<sup>9</sup> Our findings showed that a reduction in parenting stress was allied to an alleviation in the children's clinical symptoms.

In our study, the parents reported improvements in the measurements of attention, impulsivity, and attention deficit hyperactivity symptoms in their children. The mechanism of this effect might be the assuagement of parenting stress reflected in the easing of ADHD symptoms. Low levels of parenting stress result in calmness, reduced challenge between parent and child, and receptive stance in the parenting context. Consequently, parents rate their children's ADHD symptoms and behavioral problems lower than before. Indeed, the parents in the current study reported a reduction in their children's problematic characteristics and ADHD symptoms. This chimes in with the findings of another study which indicated the effectiveness of mindful parenting in reducing behavioral and attention function problems of children.<sup>21</sup>

In the present study, except for parental distress, improvement in other variables continued up until the follow-up period (8 weeks after intervention). An explanation might be that marital and parental problems (e.g. marital conflict, impaired family, parental substance abuse, and less peripheral support) may exert negative effects on parenting and mindful parenting training (doing exercises) in many different ways such as in divorce-related problems and parents having biased attention to the negative aspect of their partner, which may result in less attentiveness to their children's needs and cooperation in training them.<sup>24,25</sup>

In this study, we evaluated children's hyperactivity and attention deficit through maternal scoring. To paraphrase, we did not evaluate the school functioning of the children through seeking their teachers' comments. Future studies are recommended to evaluate the effects of mindful parenting on children with ADHD through teachers' evaluations.

## Conclusion

Children with ADHD are at risk of impairment to various aspects of their lives and mental health. Parenting stress plays a significant role in the severity of the clinical symptoms of ADHD. Childrearing programs, including mindful parenting training, are among the most important psychotherapies for these children. The current study adds to a growing body of research on mindful parenting. Our findings showed that mindful parenting was able to impact on mothers' parenting stress by improving parent-child interpersonal relationships and reducing reactivity response to the children's problematic characteristics. The reduction in parenting

stress was correlated with a decrease in ADHD symptoms and the mothers rated their children's ADHD symptoms and behavioral problems lower than before.

### Acknowledgment

MB contributed to the conception of the work and conducting of the study and agreed with all the aspects of the work. FZ contributed to the conception of the work, revised the draft, and approved the final version of the manuscript. HA contributed to statistical analysis and FA contributed to data collection of the project. The authors agreed with all aspects of the manuscript.

We sincerely appreciate all the parents who participated in the research.

**Conflict of Interest:** None declared.

### References

1. Sadock BJ, Ruiz P. Synopsis of psychiatry behavioral sciences clinical psychiatry. 11<sup>th</sup> ed. Alphen aan den Rijn: Wolters Kluwer; 2013. p. 443-61.
2. Major A, Martinussen R, Wiener J. Self-efficacy for self-regulated learning in adolescents with and without attention deficit hyperactivity disorder (ADHD). *Learn Individ Differ* 2013;27:149-56. doi: 10.1016/j.lindif.2013.06.009.
3. Zhu P, Hao JH, Tao RX, Huang K, Jiang XM, Zhu YD, et al. Sex-specific and time-dependent effects of prenatal stress on the early behavioral symptoms of ADHD: a longitudinal study in China. *Eur Child Adolesc Psychiatry*. 2015;24:1139-47. doi: 10.1007/s00787-015-0701-9. PubMed PMID: 25791080.
4. Safavi P, Ganji F, Bidad A. Prevalence of Attention-Deficit Hyperactivity Disorder in Students and Needs Modification of Mental Health Services in Shahrekord, Iran in 2013. *J Clin Diagn Res*. 2016;10:LC25-8. doi: 10.7860/JCDR/2016/14481.7671. PubMed PMID: 27190839; PubMed Central PMCID: PMC4866137.
5. Theule J, Wiener J, Tannock R, Jenkins JM. Parenting stress in families of children with ADHD: A meta-analysis. *J Emot Behav Disord*. 2013;21:3-17. doi: 10.1177/1063426610387433.
6. Abidin R. Parenting stress index. 3<sup>rd</sup> ed. Odessa, FL: Psychological Assessment Resources. 1995.
7. Heath CL, Curtis DF, Fan W, McPherson R. The association between parenting stress, parenting self-efficacy, and the clinical significance of child ADHD symptom change following behavior therapy. *Child Psychiatry Hum Dev*. 2015;46:118-29. doi: 10.1007/s10578-014-0458-2. PubMed PMID: 24668566.
8. Kent KM, Pelham WE, Jr., Molina BS, Sibley MH, Waschbusch DA, Yu J, et al. The academic experience of male high school students with ADHD. *J Abnorm Child Psychol*. 2011;39:451-62. doi: 10.1007/s10802-010-9472-4. PubMed PMID: 21103923; PubMed Central PMCID: PMC3068222.
9. Pakdaman SN. Susan Bögels and Kathleen Restifo: Mindful Parenting: A Guide for Mental Health Practitioners. Springer, New York, 2014, 328 pp. *Mindfulness*. 2014;5:467-70. doi: 10.1007/s12671-013-0256-0.
10. Gordon CT, Hinshaw SP. Parenting Stress as a Mediator Between Childhood ADHD and Early Adult Female Outcomes. *J Clin Child Adolesc Psychol*. 2017;46:588-99. doi: 10.1080/15374416.2015.1041595. PubMed PMID: 26042524; PubMed Central PMCID: PMC4670298.
11. Maniadaki K, Sonuga-Barke E, Kakouros E, Karaba R. Maternal emotions and self-efficacy beliefs in relation to boys and girls with AD/HD. *Child Psychiatry Hum Dev*. 2005;35:245-63. doi: 10.1007/s10578-004-6460-3. PubMed PMID: 15731889.
12. Meinzer MC, Lewinsohn PM, Pettit JW, Seeley JR, Gau JM, Chronis-Tuscano A, et al. Attention-deficit/hyperactivity disorder in adolescence predicts onset of major depressive disorder through early adulthood. *Depress Anxiety*. 2013;30:546-53. doi: 10.1002/da.22082. PubMed PMID: 23424020; PubMed Central PMCID: PMC3788356.
13. Wiener J, Biondic D, Grimbos T, Herbert M. Parenting Stress of Parents of Adolescents with Attention-Deficit Hyperactivity Disorder. *J Abnorm Child Psychol*. 2016;44:561-74. doi: 10.1007/s10802-015-0050-7. PubMed PMID: 26183609.
14. van de Weijer-Bergsma E, Formsma AR, de Bruin EI, Bogels SM. The Effectiveness of Mindfulness Training on Behavioral Problems and Attentional Functioning in Adolescents with ADHD. *J Child Fam Stud*. 2012;21:775-87. doi: 10.1007/s10826-011-9531-7. PubMed PMID: 22993482; PubMed Central PMCID: PMC3438398.
15. Bögels SM, Helleman J, van Deursen S, Römer M, van der Meulen R. Mindful



- parenting in mental health care: effects on parental and child psychopathology, parental stress, parenting, coparenting, and marital functioning. *Mindfulness*. 2014;5:536-51. doi: 10.1007/s12671-013-0209-7.
16. Townshend K. Conceptualizing the key processes of Mindful Parenting and its application to youth mental health. *Australas Psychiatry*. 2016;24:575-7. doi: 10.1177/1039856216654392. PubMed PMID: 27354336.
17. Duncan LG, Coatsworth JD, Gayles JG, Geier MH, Greenberg MT. Can mindful parenting be observed? Relations between observational ratings of mother-youth interactions and mothers' self-report of mindful parenting. *J Fam Psychol*. 2015;29:276-82. doi: 10.1037/a0038857. PubMed PMID: 25844494; PubMed Central PMCID: PMC4586022.
18. Bogels SM, Lehtonen A, Restifo K. Mindful Parenting in Mental Health Care. *Mindfulness (N Y)*. 2010;1:107-20. doi: 10.1007/s12671-010-0014-5. PubMed PMID: 21125026; PubMed Central PMCID: PMC42987569.
19. Shirzadi P, Framarzi S, Ghasemi M, Shafiee M. Investigating Validity and reliability of Parenting Stress Index-short form among Fathers of normal child under 7 years old. *Rooyesh-e Ravanshenasi Journal*. 2015;3:91-110. Persian.
20. Fadaei Z, Dehghani M, Tahmasian K, Farhadei M. Investigating reliability, validity and factor structure of parenting stress- short form in mothers of 7-12 year-old children. *Behavioral Sciences Research Journal*. 2010;8:81-91. Persian.
21. van der Oord S, Bogels SM, Peijnenburg D. The Effectiveness of Mindfulness Training for Children with ADHD and Mindful Parenting for their Parents. *J Child Fam Stud*. 2012;21:139-47. doi: 10.1007/s10826-011-9457-0. PubMed PMID: 22347788; PubMed Central PMCID: PMC3267931.
22. Lo HH, Wong SY, Wong JY, Wong SW, Yeung JW. The effect of a family-based mindfulness intervention on children with attention deficit and hyperactivity symptoms and their parents: design and rationale for a randomized, controlled clinical trial (Study protocol). *BMC Psychiatry*. 2016;16:65. doi: 10.1186/s12888-016-0773-1. PubMed PMID: 26980323; PubMed Central PMCID: PMC4791862.
23. Duncan LG, Coatsworth JD, Greenberg MT. A model of mindful parenting: implications for parent-child relationships and prevention research. *Clin Child Fam Psychol Rev*. 2009;12:255-70. doi: 10.1007/s10567-009-0046-3. PubMed PMID: 19412664; PubMed Central PMCID: PMC2730447.
24. Graziano PA, McNamara JP, Geffken GR, Reid A. Severity of children's ADHD symptoms and parenting stress: a multiple mediation model of self-regulation. *J Abnorm Child Psychol*. 2011;39:1073-83. doi: 10.1007/s10802-011-9528-0. PubMed PMID: 21629991.
25. Da Paz NS, Wallander JL. Interventions that target improvements in mental health for parents of children with autism spectrum disorders: A narrative review. *Clin Psychol Rev*. 2017;51:1-14. doi: 10.1016/j.cpr.2016.10.006. PubMed PMID: 27816800.