

The Role of Parent-Child Interaction Therapy and Mindfulness-Based Therapy on the Behavioral Problems of Students with Attention-Deficit/Hyperactivity Disorder

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Received October 01, 2021; Revised October 28, 2021; Accepted November 20, 2021

Abstract

Background: Attention-deficit/hyperactivity disorder (ADHD) is a serious behavioral disorder with considerable personal and social consequences, including significant emotional distress among elementary school students and their caregivers. The present study aimed to investigate the effectiveness of parent-child interaction therapy (PCIT) and mindfulness-based therapy (MBT) on the behavioral problems of students with ADHD in Ahvaz, Iran in 2020.

Methods: This pretest-posttest quasi-experimental study included two experimental groups and a control group. The statistical population comprised all children aged 6-12 years visiting psychology and psychiatry clinics in Ahvaz, Iran who were diagnosed with ADHD by specialists. A sample of 45 children was conveniently selected and randomly allocated to two experimental groups and a control one. The first experimental group underwent twelve sessions (60-minutes sessions per week) of PCIT. Moreover, the MBT was performed on the second experimental group for twelve 60-minute sessions, and the control group did not receive any intervention. The research instrument included The Child Symptom Inventory (CSI-4). Analysis of covariance in SPSS version 24 was used to analyze the data.

Results: The PCIT and MBT significantly mitigated the behavioral problems of the students with ADHD, including ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety ($P<0.001$). The PCIT was significantly superior to the MBT in the mitigation of ADHD signs and symptoms ($P<0.001$).

Conclusion: As the findings supported the effectiveness of PCIT and MBT on the behavioral problems of students with ADHD, workshops should be held on the treatment of behavioral problems in these students.

Keywords: Parent-child relations, Mindfulness, Problem behavior, Attention deficit disorder with hyperactivity (ADHD), Students

How to Cite: Azhdari Z, Alizadeh M, Homaei R. The Role of Parent-Child Interaction Therapy and Mindfulness-Based Therapy on the Behavioral Problems of Students with Attention-Deficit/Hyperactivity Disorder. Int. J. School. Health. 2022;9(1):18-25. doi: 10.30476/INTJSH.2022.93828.1201.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a highly prevalent pediatric behavioral problem, especially among school-age children. ADHD signs and symptoms often arise in early childhood and persist through childhood, adolescence, and (in 70% of cases) adulthood (1). ADHD is a developmental neurological disorder characterized by impulsivity, absent-mindedness, and hyperactivity (2, 3). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), ADHD must be present in at least two domains, must disrupt the person's functioning depending on his/her level of social and academic growth, and must be present in the absence of pervasive developmental disorders (PDD), schizophrenia, and other psychotic disorders (4). ADHD is a serious behavioral disorder with numerous personal and social ramifications, including significant emotional distress among preschool children and their caregivers (5).

Children with ADHD usually hate assignments that demand intellectual effort and concentration and are easily distracted by the events happening around them. If not treated during childhood, this disorder may lead to other disorders such as defiance, opposition, conduct disorder, anxiety, and depression (6). ADHD is accompanied by disrupted friendships and family relations, reduced participation in school activities, substance use, crime and misdemeanor, diminished mental health in parents, and heavy costs for the family and society (7, 8).

According to Cavallina and other colleagues (9), certain parenting styles may exacerbate some ADHD signs and symptoms. For instance, great parental expectations about children's obedience predict the risk of ADHD. Inconsistency in parenting has also shown strong associations with ADHD. Having a father who lacks responsive behaviors and a mother who lacks positive attention during preschool years predicts a higher level of childhood inattention. Furthermore,

having an interfering father predicts a higher level of the ADHD composition (10, 11).

Although medications can alleviate ADHD, parents may need to learn behavioral strategies to manage their children's behaviors. Parental coaching is a psychological-educational approach that trains executive cognitive-behavioral techniques to parents to be used at home when dealing with children's behavioral problems. These techniques are based on social learning rules and aim to moderate behavioral problems in the child's living environment. Altering the environmental background (such as ordering) and outcomes (such as deprivation) can moderate children's behavior (12).

In recent decades, mindfulness has been used to mitigate or resolve different problems, including sadness, psychological distress, and anxiety. The construct of mindfulness is defined as paying purposive and non-judgmental attention in a certain way at the present moment (13). Mindfulness therapy is a cognitive therapy that encompasses different meditations, body scan, and several cognitive exercises that specify the link between mood, thoughts, feelings, and bodily sensations. All these exercises facilitate attention to bodily sensations and the environment at the present moment and reduce automatic processing (14). Bigelow and other colleagues (15) examined the effectiveness of mindfulness meditation in alleviating ADHD symptoms in two children aged 10 and 14 years old. Following the intervention, the parents' complaints about their children's maladaptive behaviors were reduced.

Corthorn (16) reported that mindfulness significantly and positively affected the parent-child relationship. Mindfulness significantly, indirectly, and negatively affects emotional symptoms, behavioral problems, and hyperactivity, and directly influences social behavior in children. Javadi and colleagues (17) reported that parent-child interaction therapy (PCIT) effectively mitigated children's maladjustment, undesirable behaviors, and behavioral problems, and promoted children's adjustment and parent-child interactions. According to Lee and colleagues (18), mindfulness-based cognitive therapy significantly alleviated children's anxiety, oppositional defiant disorder (ODD), and conduct disorder, and promoted their mindfulness. Magnin and Maurs (19) also showed that mindfulness training diminished ADHD and ODD signs and symptoms in children.

Given the paucity of studies on the behavioral

problems in elementary school students with ADHD, the present study aimed to investigate the effectiveness of PCIT and MBT on the behavioral problems of students with ADHD.

Methods

Design and Participants

This quasi-experimental pretest-posttest study comprised two experimental groups and a control group. First, the authors visited specialized psychology and psychiatry clinics in Ahvaz, Iran in 2020 and briefed the heads of the clinics, who were then asked to introduce children diagnosed with ADHD. In interviews with these children's parents, the existence of definitive symptoms of ADHD was determined by a licensed clinical psychologist or psychiatrist. A sample of 45 eligible participants was selected and randomly allocated to two experimental groups and a control group ($n=15$ per group). The specified sample size was selected according to G-Power software with an effect size of 1.60, a test power of 0.90, and a significance level of 0.05 (20). The students with ADHD were then randomly allocated into experimental and control groups via applying the coin-throwing method. Randomization was performed after the parents' consent to participate and completion of all the baseline measures and eligibility interviews. Each experimental group received either the PCIT or the MBT, while the control group received no intervention. Pre-test and post-test were administered to all three groups. The inclusion criteria were 6-12 years of age, parents' informed consent for participation, and absence of other ongoing therapies. The exclusion criteria were the participants' unwillingness to fill out the questionnaire, missing more than two therapy sessions, or returning incomplete questionnaires.

Procedure

The participants were randomly allocated to experimental and control groups. Prior to administering the interventions to the experimental groups, the parents of students with ADHD filled out the questionnaires (pre-test). The parents in the experimental groups then received in-person and online PCIT or MBT by a specialized and trained practitioner in two treatment fields. The control group received no intervention. The interventions were administered in 12 60-minute sessions once a week. The protocols for the PCIT and MBT are given in Tables 1 and 2, respectively. After the interventions, post-test was administered to all three groups.

Table 1: The contents of parent-child interaction therapy sessions

Session	Content
1	Information about the children's past and current problems was collected through an interview, and the therapist got to know the parents and children.
2	Evaluation (interview, completing the questionnaires, observing the parent-child interaction)
3	Giving feedback to the families, familiarizing them with the structure of the therapy, answering their questions
4	Training child-directed interaction skills, the objectives of child-directed interaction, giving assignments
5	Training child-directed interaction skills, "don't rules", modeling the "do rules", giving assignments
6	Training child-directed interaction skills, selective disregard, strategic attention, giving assignments
7	Training the integrated modeling of all the skills, leading parents' activities during role-modeling, giving assignments
8	Discussing the logic of the game, choosing toys at home, giving assignments
9	Answering parents' questions, explaining the use of obedience exercises, training effective directions
10	Training decision-making, the outcomes of abiding by the rules
11	The consequences of breaking the rules, providing complementary information about the time of deprivation
12	Directing and preparing the parents for modeling, concluding the sessions, answering questions

Table 2: A summary of the mindfulness-based therapy protocol

Session	Content
1	Training mindfulness, the difference between conscious attention and regular attention, and the fact that many of us live on the autopilot mode to children; the children learn about the benefits of this method through exercises such as discovering awareness in a cup.
2	Training breathing mindfulness, sensory mindfulness, and movement mindfulness to children; the children learn more about the concept and benefits of mindfulness through exercises such as meditation and mindfulness of movements.
3	The children become more familiar with their thoughts, feelings, and bodily sensations through exercises such as body mindfulness, better understand the differences between them, and become aware of their effects on their experiences.
4	The children become more familiar with their thoughts, feelings, and bodily sensations and their difference from reality through exercises such as discovering a platter of fruits, tasting, and conscious movement.
5	The children become further aware of their auditory sense through exercises such as hearing mindfulness and body mindfulness, recognize the stimulated thoughts, feelings, and bodily sensations, and better distinguish them from reality.
6	The children become more familiar with emotions through exercises such as conscious expression of emotions, and realize that their thoughts affect and are affected by their emotions and bodily sensations.
7	The children understand the difference between conscious seeing and regular seeing through exercises such as conscious seeing and mindful movements, learn to distinguish judging from describing, and view events differently.
8	The children strengthen their attention through examining visual illusions and practicing mindful movement, and develop their mindfulness.
9	The children become familiar with mindful touching through exercises and consciously perceive the world by using the tactile sense.
10 and 11	The children develop their mindfulness, realize their judgments about the olfactory sense, and learn that they can choose to respond to experiences through exercises such as judging bad odors and mindful movement.
12	This session aims to integrate the mindfulness of different senses. The children learn that their thoughts and feelings are not real, and are merely thoughts and feelings.

Instruments

The Child Symptom Inventory (CSI-4) - parental version: The CSI-4 is a behavior rating scale developed based on DSM-3 classifications to screen for 18 behavioral and emotional disorders in children aged 5 to 12 years. It was revised in 1994 based on DMS-4. This inventory has a parental and a teacher version. The parental version has 112 questions designed for 11 major groups and an additional group of behavioral disorders, including ADHD, ODD, conduct disorder, generalized anxiety disorder, social phobia, separation anxiety disorder, obsessive-compulsive disorder (OCD), specific phobia, major depression, dysthymic disorder,

schizophrenia, PDD, Asperger syndrome, facial and motor tics, post-traumatic stress disorder (PTSD), and bulimia (21). In the current study, the questions were used in four subscales, namely ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety). The CSI-4 are scored based on a four-point Likert scale (0 to 3). The cut-off points for ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety were 9, 5, 2, and 4, respectively (22). In the Persian version of CSI-4, the content validity ratio (CVR) and content validity index (CVI) were reported to be 0.90 and 0.88, respectively. Moreover, the face validity of the CSI-4 was examined and confirmed by ten psychologists (22). Mohammad

Esmaeel (23) corroborated the reliability ($\alpha=0.76$) and validity of the Persian version of this inventory. In the present study, Cronbach's alpha coefficient was 0.81 for the questionnaire.

Data Analysis

The data were analyzed using descriptive (mean, standard deviation) and inferential statistics (analysis of covariance with Bonferroni post-hoc test, and the tests of its assumptions) by SPSS version 24 at the significance level of $\alpha=0.05$.

Results

The participants included 45 elementary school students with ADHD, aged 9.13 ± 2.54 years old. The demographic variables of the participants are shown in Table 3. Table 4 presents the mean (M) and standard deviation (SD) of behavioral problems in the students with ADHD across all three groups on pre- and posttest.

The assumptions related to the analysis of covariance were first checked. The pre-test scores of behavioral problems were regarded as the covariates, and the post-test scores as the dependent variables.

The correlation coefficients between the pre-and post-test scores were 0.89, 0.55, 0.62, and 0.73 for the four variables of ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety, respectively ($P<0.05$). The linearity of the relationships between the covariates and the dependent variables was confirmed. The variance inflation factor (VIF) was used to measure multicollinearity. The results suggested that the assumptions were satisfied.

The results of Levene's test further corroborated the homogeneity of variances in the experimental and control groups on the pre-test; therefore, the ANCOVA could be run. An ANCOVA was performed to examine the homogeneity of the regression line slopes and the group \times pre-test interaction. Based on the results, the regression line slopes were non-significant on pre- and posttest in all three groups. Thus, the group \times dependent variables interaction was not significant, thereby confirming the homogeneity of the regression line slopes.

According to the results of one-way analysis of covariance on the post-test scores of the dependent variables, the F-values was 26.39 for ADHD signs and symptoms ($P<0.001$), 71.4 for opposition and defiance ($P<0.001$),

Table 3: Demographic variables of the participants

Groups	M \pm SD of students' age (years)	M \pm SD of parents' age (years)	Fathers' education		Mothers' education	
			High school education	College education	High school education	College education
PCIT	9.25 \pm 2.11	38.69 \pm 5.35	33.33% (n=5)	66.67% (n=10)	26.67% (n=4)	73.33% (n=11)
MBT	9.09 \pm 2.67	35.13 \pm 6.84	40.00% (n=6)	60.00% (n=9)	40.00% (n=6)	60.00% (n=9)
Control	9.33 \pm 2.55	36.94 \pm 6.43	26.67% (n=4)	73.33% (n=11)	26.67% (n=4)	73.33% (n=11)
P	0.999	0.328	0.451		0.630	

PCIT: Parent-child interaction therapy; MBT: Mindfulness-based therapy

Table 4: Mean and SD of variables in experimental and control groups

Variables	Phase	PCIT	MBT	Control	P (Inter-group comparisons)
		M \pm SD	M \pm SD	M \pm SD	
ADHD signs and symptoms	Pre-test	32.07 \pm 4.21	31.33 \pm 3.17	32.80 \pm 3.52	0.819
	Post-test	28.33 \pm 4.65	28.93 \pm 3.90	32.67 \pm 3.65	0.001
	P (intra-group comparisons)	0.001	0.001	0.918	-
Opposition and defiance	Pre-test	15.47 \pm 2.32	16.13 \pm 1.84	15.00 \pm 1.92	0.467
	Post-test	10.80 \pm 1.89	11.87 \pm 1.30	14.67 \pm 1.71	0.001
	P (intra-group comparisons)	0.001	0.001	0.617	-
Social anxiety	Pre-test	8.13 \pm 1.30	7.73 \pm 1.33	7.78 \pm 1.22	0.539
	Post-test	4.53 \pm 1.18	4.93 \pm 1.28	7.33 \pm 1.39	0.001
	P (intra-group comparisons)	0.001	0.001	0.819	-
Separation anxiety	Pre-test	14.47 \pm 2.26	14.86 \pm 2.39	15.07 \pm 2.31	0.602
	Post-test	10.07 \pm 2.25	10.21 \pm 2.16	14.27 \pm 2.08	0.001
	P (intra-group comparisons)	0.001	0.001	0.414	-

PCIT: Parent-child interaction therapy; MBT: Mindfulness-based therapy

Table 5: Bonferroni post-hoc test for paired comparison of the variables in the post-test phase

Variables	Groups	Mean difference	SE	P
ADHD signs and symptoms	PCIT – MBT	1.60	0.51	0.013
	PCIT – Control	3.70	0.51	0.001
	MBT – Control	2.09	.52	0.001
Opposition and defiance	PCIT – MBT	0.70	0.37	0.201
	PCIT – Control	4.22	0.37	0.001
	MBT – Control	3.51	0.38	0.001
Social anxiety	PCIT – MBT	0.73	0.35	0.135
	PCIT – Control	3.02	0.35	0.001
	MBT – Control	2.29	0.36	0.001
Separation anxiety	PCIT – MBT	0.77	0.34	0.092
	PCIT – Control	3.75	0.34	0.001
	MBT – Control	2.98	0.35	0.001

35.15 for social anxiety ($P<0.001$), and 55.4 for separation anxiety ($P<0.001$). These findings revealed a significant difference between the experimental and control groups concerning the dependent variables.

Bonferroni's post-hoc test was performed to pinpoint the difference (Table 5). Based on Table 5, the means of the three groups significantly differed in terms of ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety. The PCIT and MBT significantly differed only in the mitigation of ADHD signs and symptoms, to the benefit of the former therapy.

Discussion

The aim of the present study was to investigate the effectiveness of PCIT and MBT on the behavioral problems of students with ADHD in Ahvaz, Iran. The experimental and control groups significantly differed in terms of dependent variables. The PCIT and MBT reduced the scores of behavioral problems in the students with ADHD in four domains of ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety. The PCIT performed significantly better than the MBT only in the mitigation of ADHD signs and symptoms, which is consistent with the results of Chan and colleagues (24), Siebelink and colleagues (25), and Al Sehli and colleagues (26).

The PCIT protocol emphasizes the parents' influence on their children; addresses parents' concerns about their children, their behavior towards the children with ADHD, and the child's behavior towards them; and provides adequate information to promote parents' perception of their children. The PCIT program encompasses a clear framework for directing the process of cultural adjustment (27). The purpose of

this educational program is to encourage parents to be actively involved in an intervention that improves the family's functioning, expands parenting methods, regulates emotions, and develops emotional status. As the closest people to children, parents have the greatest share of children's education and learning. Parents' correct behavior, therefore, improves the parent-child relationship, helps them better understand their children's needs, and actively and effectively alleviates their and their children's problems.

PCIT trains parents to pay attention to and interact with their children to improve their relationships. In this therapy, parents acquire skills for developing secure relationships that will benefit the children's growth. Parents learn to get closer to their children, use better parenting styles that are more compatible with their children's needs, pay more attention to their children's adjusted behaviors and less attention to their maladjusted behaviors (28). Children also learn to better respond to these interactions. This therapy aims to improve the quality of the parent-child relationship by reducing parental stress, improving parenting skills, shaping parents' view of their children's maladaptive behaviors, and increasing attention and warmth in the parent-child interaction, thereby improving the management of children's behaviors by parents and promoting the parent-child relationship.

Mindfulness also teaches children to live in the here and now, pay attention to their thoughts, feelings, and bodily sensations, and be kind and non-judgmental towards themselves. It also helps them let go of past-oriented (characteristic of a depressive mood) and future-oriented thinking (characteristic of anxiety), develop problem-solving skills, and implement efficient coping strategies (28). Children learn to merely observe events, stop

automatic and habitual reactions to events, discover different aspects of the event or situation, choose the best solution, and react more appropriately through the use of effective problem-solving. In this way, children can better manage their emotions, which mitigates their behavioral problems. Mindfulness highlights higher-order psychological processes to help children with behavioral problems and ADHD to inhibit their behaviors, thoughts, and emotions, an inhibition that requires the use of mental powers (29). In this therapy, children with behavioral problems and ADHD learn to pay attention constantly, decide to pay attention to certain goals or activities, and organize and plan their behaviors accordingly. Through mindfulness, children with ADHD can take care of themselves, protect their social relationships, and somewhat regulate and control their cognition, thoughts, and behaviors (18). Thanks to its effective role in emotion regulation, mindfulness greatly contributes to inhibition as an autonomous ability; higher scores of mindfulness and mindful attention can predict correct responses in inhibitory control tasks. Mindfulness intervention can affect behavioral inhibition and self-control (two components of executive functioning) in people with ADHD (15). In fact, self-control prevents the interference of other thoughts with the current thought. Mindfulness can alleviate this behavioral problem in children with ADHD by teaching them to observe their thoughts and accept them without judgment or criticism.

Having a child with ADHD causes certain problems for parents; diminishes their capabilities; limits their parenting role; causes anxiety, a sense of incompetence in parenting, and poor parent-child emotional attachment; increases stress and the rate of divorce; and disrupts family relations. The PCIT strengthens the parent-child relationship, provides a peaceful family atmosphere, directly affects the parents, increases their acceptance and empathy, and reduces their interpersonal problems. In this way, parents can efficiently play their roles, and the family's abilities are improved in all domains.

Limitations

Some participants had little awareness as to the topic of the study and did not fully cooperate. Moreover, there was extensive literature available on the studied variables compared to other children with special needs. Finally, the questionnaires were distributed online and there were problems when receiving and analyzing them.

Conclusions

According to the findings, PCIT and MBT decreased ADHD signs and symptoms, opposition and defiance, social anxiety, and separation anxiety in students with ADHD. At the practical level, taking into account the effectiveness of the PCIT and MBT in decreasing ADHD signs and symptoms in students with ADHD, it is suggested to present PCIT and MBT to counselors and therapists in Welfare centers to use these therapies method for students with ADHD.

Ethical Approval

The study was approved by the Ethical Committee of Islamic Azad University-Ahvaz Branch (code: IR.IAU.AHVAZ.REC.1399.116). Also, written informed consent was obtained from the participants.

Acknowledgement

This article was extracted from a part of the PhD dissertation of Ms. Zeynab Azhdari in the Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran. The researchers wish to thank to all students with ADHD, their parents and teachers in Ahvaz who have helped us in preparing this study.

Conflicts of interest: None declared.

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