

Research Paper: The Influence of Positive Parenting Training on Improving Behavioral Function and Impulsivity in Children Suffering From Attention-Deficit/Hyperactivity Disorder



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ABSTRACT

Background: Children with Attention-Deficit Hyperactivity Disorder (ADHD) have deficiencies in their executive functions and also impulsivity that can result in various social harms and criminal behaviors.

Methods: The research had a two-group semi-experimental design (case/control) with a pre-/post-test. The statistical population consisted of all students' mothers aged between 7 and 12 years old suffering from ADHD. The studied samples included 30 parents matched based on age and randomly divided into the case and control groups with 15 people in each group and were examined from 2nd February to March 2020. Positive parenting training was performed for the case group in eight sessions of 90 minutes by observing all protocols. Both groups experienced pre- and post-test. We applied the BRIEF (parent form) and Canners (parent form) questionnaires to collect data. Data were analyzed by MANCOVA using SPSS v. 26 software at a significance level of 0.05.

Results: The studied samples were in the age range of 22-40 years (Mean±SD: case group: 32.93±6.04 years and control group: 34.13±5.47 years), 56% with education lower than diploma (0.60% and 46.7% for the case and control groups, respectively), and 44% had an official business (0.40% and 46.7%, respectively). Results showed significant differences in the variables of executive functions (inhibition, attention transfer, emotional control, initiation, working memory, planning, material organization, and control) and reducing impulsivity (cognitive problems-neglect, hyperactivity, opposition, and ADHD index) in the control and case groups ($P < 0.001$).

Conclusion: Positive parenting training significantly affects improving executive functions and impulsivity in children aged between 7 and 12 years old suffering from ADHD. Accordingly, it is achievable to help modify their social behaviors and also decrease the amount of conflict and legal problems among these children by providing a codified positive parenting training program in their educational programs.

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1. Introduction

Attention-Deficit Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder that affects 5% of children and 2.5% of adolescents around the world [1, 2]. Various studies have shown a close and well-known relationship between ADHD and anxiety, depression, a tendency to addiction, and antisocial and criminal behaviors [3, 4]. It is assumed that these patients struggle with the law eight times more than the normal population and they should be seriously identified and treated [5]. Not diagnosing and treating the disease in childhood can result in conduct disorder, antisocial personality, and serious conflict with the law [6, 7]. Experts believe that if underlying factors of the disorder are co-occurred by an authoritarian and inefficient style of parenting, the symptoms of the disease will be spread [8, 9].

This disease is treated mainly by pharmaceutical treatment. Notwithstanding, the results of studies have revealed that applying some parenting education techniques is effective in treating the symptoms of hyperactivity and promoting executive functions [10].

Positive parenting is a new and comprehensive plan about parenting that creates a positive relationship between parents and their children and assists parents learn effective management strategies to behave well with various child developmental and behavioral issues [11]. This plan holds five levels of intervention that have focused on increasing mothers' self-sufficiency and self-efficacy to manage and control behavior. It has been confirmed that it is effective in treating behavioral disorders and parents' ineffective parenting practices [12].

Some domestic research has also revealed that parenting education is effective on impulsivity, hyperactivity symptoms, and executive functions. Positive parenting training is able to improve executive function and self-efficacy [13], stress and behavioral problems [14], organizational skills, academic performance, attention deficit and working memory [15], impulsivity [16], and executive functions and cognitive dimensions [17] in children suffering from ADHD.

Positive parenting encourages positive parent-child interactions and educates parents on how to be compatible and apply non-violent disciplinary techniques; hence, it stops negative parent-child cyclic behaviors and increases empathy between the parents and children. However, ADHD influences children's interaction with their

parents and the way that parents respond and increases executive functions and reduces the symptoms of hyperactivity and inattention in these children [18].

Despite the mentioned studies, there are limited studies conducted on interventions concentrated on positive parenting training on executive functions and impulsive behaviors of ADHD in Iran. Accordingly, this study was conducted in order to examine the influence of positive parenting on improving executive functions and impulsivity in these children.

2. Materials and Methods

This study was conducted as semi-experimental research with a pre-/post-test design and two case and control groups. The statistical population consisted of all mothers of elementary school students between 7 and 12 years old suffering from ADHD in District 5 of Tehran in 2020-2021. The sample size was 30 cases based on similar studies matched based on age and the subjects were randomly divided into the case (n=15) and control (n=15) groups. Parents could join the study by having the following criteria: a diagnosis of ADHD by a clinical psychologist and a child psychiatrist, at least a diploma degree, and an enthusiasm to participate in our project. Concurrence of any mental, physical, cerebral disorder, or specific motor-sensory disability in children, and an IQ of less than 100 were the exclusion criteria. All participants provided informed consent in order to participate in the research. The achieved information was absolutely confidential and the researchers observed the Helsinki Convention (Code: IR.IAU.SRB.REC.1399.002).

Parents completed "the Connors questionnaire", a standard questionnaire for executive functions and measuring the behavior of children to measure the children's behaviors and practices at home. Then, the case group experienced the intervention of eight sessions that lasted 90 minutes. The sessions were conducted in the form of questions and responses, group discussions, and presenting homework. Sanders's plan was the source to achieve the content of the positive parenting training sessions [19] (Table 1). Homework was given at the end of each session, and the homework and topics of the earlier session were reviewed at the beginning of the next session. Post-tests were conducted for both the case and control groups at the end of the sessions.

We used SPSS v. 26 statistical software to analyze collected data descriptively (frequency, percentage, mean and standard deviation) and analytically (MANCOVA and Bonferroni test with 0.05 error).

Table 1. Treatment program based on the saunders positive parenting education

Sessions	Contents	Targets
First	Introducing group members, a brief description of positive parenting and the purpose of using it, explanation of the group's constitutions and group formulations, explanation of the child's problem and its symptoms	Familiarizing parents with the disease and its symptoms and a positive parenting program in order to highlight the need for such educational programs and motivate and attract their cooperation
Second	Review the previous session, describing and defining positive parenting in detail, important aspects of positive parenting	Familiarity of the mother with the factors affecting the child's behavior and positive parenting program and make the mothers informed that they can set goals for changing her and the child's behavior
Third	Managing problem behaviors, creating positive parenting principles and reviewing and introducing behavioral charts	Strengthening positive interactions between parent and child and providing strategies to establish a relationship as an important first step in controlling the child as well as teaching strategies to create desirable behavior in the child
Fourth	Planning, family saving guides, developing parenting principles, planning daily life activities	Teaching skills to control mild and severe undesirable behaviors of the child
Fifth	Investigating the family atmosphere and identifying troublesome situations in the family	Teaching how to control the child in situations where control is minimized and also providing strategies for family survival
Sixth	Managing problem behaviors, practicing, preparing, and educating parents for telephone counseling	Investigating how parents interact with the child
Seventh	Addressing problems raised by parents, encouraging parents to review treatment goals and advances, and encouraging parents to come up with new solutions	Overview of issues and topics raised in previous meetings
Eighth	Practicing problem-solving skills to manage children's behavioral problems in the future	Describing the factors that will prevent the maintenance of changes and corrections and provide solutions to maintain these changes

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Instruments

Behavior Rating Inventory of Executive Function (BRIEF) (parents form)

BRIEF is an assessment of executive function behaviors at home and at school for children and adolescents aged 5-18 years. The BRIEF has demonstrated good reliability, with high test-retest reliability ($r_s \approx 0.88$ for teachers, $.82$ for parents), internal consistency (Cronbach's alphas $\approx 0.80-0.98$), and moderate correlations between parent and teacher ratings ($r_s \approx 0.32-0.34$). Evidence for the convergent and divergent aspects of the BRIEF's validity comes through its correlation with other measures of emotional and behavioral functioning.

Conners' Parent Rating Scale (CPRS)

This scale was first designed in order to assess the influence of stimulant medicines on children suffering from ADHD and to recognize these children from normal children. Currently, it is normal to use a modified form of the questionnaire (27 items) to diagnose children with ADHD. The reliability coefficient of the retest for the total score is 0.58 and the Cronbach's alpha coefficient for the total

score is 0.73 and its validity is 0.84 . It measures the three factors of coping behavior, hyperactivity, and attention deficit. The range of scores for each question is from zero to 3 (never, occasionally, often, and extremely high) [20].

3. Results

The studied samples were in the age range of 22-40 years. The age range of the case group was 32.93 ± 6.04 years and that of the control group was 34.13 ± 5.47 years. Also, 56% had an education level of below diploma (0.60% of the case group) and (46.7% in the control group), and 44% had an official business (0.40% in the case group and 46.7% in the control group).

A comparative study of the mean and standard deviation of scores related to executive performance in the case and control groups showed a significant difference between the mean scores of different dimensions of executive functions (inhibition, attention transfer, emotional control, initiation, working memory, planning, organizing material, and control) of the case and control groups in the pre-test ($P \geq 0.05$). The MANCOVA on the mean executive dimensions of the test and control groups with pre-test control showed a significant dif-

Table 2. One-way Multivariate Analysis of Covariance (MANCOVA) results of executive function in the two groups

Variable	Dimensions	Total Squares	Degrees of Freedom	Mean Squares	F	Sig.	Effect Size	Power
Executive Function	Inhibition	104.53	1	104.53	5.76	0.02	0.17	0.64
	Attention transfer	112.13	1	112.13	7.93	0.009	0.22	0.77
	Emotional control	163.33	1	163.33	19.72	0.001	0.41	0.99
	Initiation	53.33	1	53.33	9.58	0.004	0.25	0.84
	Working memory	120	1	120	19.32	0.001	0.40	0.98
	Planning	177.63	1	177.63	9.68	0.004	0.25	0.85
	Organizing materials	154.13	1	154.13	21.22	0.001	0.43	0.99
	Control	40.83	1	40.83	5.54	0.02	0.16	0.62

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ference between the parents with hyperactive children in the case and control groups in terms of function (inhibition ($P \leq 0.02$, $F = 5.76$)), attention transfer ($P \leq 0.009$, $F = 7.93$), emotional control ($P \leq 0.001$, $F = 19.72$), initiation ($P \leq 0.001$, $F = 9.58$), working memory ($P \leq 0.001$, $F = 19.32$), planning ($P \leq 0.004$, $F = 9.68$), material organization ($P \leq 0.001$, $F = 21.22$) and control ($P \leq 0.02$, $F = 5.54$). In other words, the used intervention was tested based on the mean score of the dimensions of executive functions (reducing inhibition, attention transfer, emotional control, initiation, working memory, planning and organizing materials, and increasing control) of the case group, which were equal to 0.17, 0.22, 0.41, 0.25, 0.40, 0.25, and 0.43 (Table 2).

The results of a comparative study of the mean and standard deviation of impulsivity scores in the case and control groups showed an insignificant difference between the mean scores of various dimensions of impulsivity (cognitive-inattention problems, hyperactivity, opposition, and ADHD index) of the case and control groups in the pre-test ($P \leq 0.05$). The results of Table 3 indicated after controlling the pre-test, there was a significant difference between parents with

hyperactive children in the case and control groups in terms of impulsivity (cognitive-inattention problems ($P \geq 0.001$, $F = 27.51$), hyperactivity ($P \geq 0.001$, $F = 20.06$), opposition ($P \geq 0.01$, $F = 6.18$) and ADHD index ($P \geq 0.02$, $F = 6.01$). In other words, the used intervention was tested based on the significant increase in the mean scores of the dimensions of impulsivity in the case group, which were equal to 0.17, 0.41, and 0.49, respectively.

4. Discussion

This study was conducted in order to examine the effect of positive parenting on executive and impulsive functions in hyperactive children in the test and control groups. Intervention sessions based on a positive parenting approach on the case group were completed and the post-test results indicated a significant difference between the parents of the two case and control groups in dependent variables of executive function (inhibition, attention transfer, emotional control, initiation, working memory, planning, organizing and controlling materials) ($P \leq 0.001$). In other words, positive parenting training reduced inhibition, transferring the atten-

Table 3. One-way multivariate Analysis of Covariance (MANCOVA) results of impulsivity score in the two groups

Variable	Dimensions	Total Squares	Degrees of Freedom	Mean Squares	F	Sig.	Effect Size	Power
Impulsivity	Cognitive problems/ Attention Deficit	136.53	1	136.53	27.51	0.001	0.49	0.99
	Hyperactivity	120	1	120	20.06	0.001	0.41	0.99
	Opposition	48.13	1	48.13	6.18	0.01	0.18	0.67
	ADHD index	154.13	1	154.13	6.01	0.02	0.17	0.65

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tion, controlling the emotion, initiation, working memory, planning, organizing the material, and increased control of the case group. These results are in agreement with the results achieved by earlier research in this field [12-14].

Other results also showed a significant difference between the parents of the two case and control groups in impulsivity (cognitive problems - inattention, hyperactivity, opposition, and ADHD index) ($P \leq 0.001$). In other words, positive parenting training could reduce the dimensions of impulsivity. These results are in agreement with the results of past research in this field [14, 16].

Isfahani et al. conducted a study and realized that Adlerian parenting education was effective on executive functions, cognition/inattention, hyperactivity, and ADHD [17]. Shamsi and Ghamrani [15] concluded that parenting education increased executive functions, organizational skills, academic performance, and reduced symptoms of hyperactivity. Sheikhi et al. showed that a positive parenting plan significantly affected ADHD and impulsivity in children with ADHD [16]. Positive parenting training for parents improved executive function in their children. Helm et al. concluded that parental education plays an effective role in improving and increasing the level of children's executive function [17]. There are some ideal therapeutic objectives for these patients, including improving the level of executive functions and reducing impulsivity. Improving these dimensions was effective in reducing social damages and conflict of these patients with the law. Reviewing the perspectives enables us to understand that parents learn the skills to develop secure relationships and grow their children in a positive parenting plan [10]. Positive parenting encourages positive parent-child interactions and educates parents on consistent behaviors and using nonviolent disciplinary techniques leading to the break the cyclic negative parent-child behaviors and increase parent-child empathy [11].

Regrettably, ADHD severely and adversely affects the child's interaction with parents and vice versa. As a child cannot communicate correctly with his or her parents, consequently, their children's parents' behaviors will be more negative and have less guidance, direction, and encouragement dimensions. Normally, these children's parents behave emotionally to realize their children's demands. Training a positive parenting program enables parents to manage their children's behaviors more efficiently and consequently, children's good behaviors will be increased and inadequate behaviors will be reduced. A positive parenting program also causes these children to have impulsive behaviors by encouraging positive parent-child interactions and non-violent disciplinary techniques. Impulsive behav-

ior and thoughts are decreased and attention skills are also naturally improved [12].

A positive parenting program reduces hyperactivity-impulsivity in children suffering from the program, hence, it is possible to state that children's behavioral problems directly affect parent-child interaction and relationships. Families of children with behavioral disorders function more destructively than families with normal children. This destructive function is able to cause various behavioral harms and legal problems and conflicts [9]. It is essential to state that parents' negative behaviors (such as shouting and threatening) strengthen the child's negative behaviors (such as irresponsibility and disobedience), which intensify parental behaviors and lead to more violence and impulsive behaviors in children. A positive parenting program violates this faulty cycle by promoting parents' positive interactions and educating them to use nonviolent techniques. Parents learn the skills to create safe relationships for their child's development using normal parenting methods and modifying the structure of the parent-child interaction in a positive parenting plan, and consequently, can increase the child's social behaviors and reduce his/her negative behaviors. Parents learn to approach their child, use more effective parenting styles that are in agreement with their child's requirements, and consider the child's adaptive behaviors and neglect his or her maladaptive behaviors. This cycle also reduces hyperactive behaviors, particularly impulsivity in children suffering from program [10, 12].

5. Conclusion

The results achieved in this study (despite the requirement for health protocols caused by the corona epidemic that limited determining the sample size and selection in a special region of the country) confirmed the significance and notable influence of positive parenting training on improving social functions and aggression in children with ADHD. It is possible that paying no attention to the behavioral problems in these children provides widespread social harm and serious legal problems. Consequently, positive parenting training as a therapeutic approach in the relevant educational schools seems to be important and essential to prevent future destructive events.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of the Islamic Azad university (Code: IR.IAU.SRB.REC.1399.002).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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