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Impact of Parental Behavior Training for Mothers of Children with ADHD on Reducing Aggression and Maladaptive Behavior in their Children

Mohsen Amiri[1] (PhD), Mahdis Norouzi[2] (MSc), Faeze Rostamian[2] (MSc), Maryam Pasyar[3] (MSc), Somaye Tavasoloian-Ghomashchi[2] (MSc), Ehsan Malahmadi[4] (PhD)

1. Department of Psychology, University of Zanjan, Zanjan, Iran
2. Department of Psychology, Faculty of Education and Psychology, Zanjan Branch, Islamic Azad University, Zanjan, Iran
3. Department of Psychology, Faculty of Education and Psychology, Yazd Branch, Islamic Azad University, Yazd, Iran
4. Department of Psychology, Faculty of Psychology and Education, University of Tehran, Tehran, Iran

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Corresponding Author:
Mohsen Amiri,
Department of Psychology,
University of Zanjan,
Zanjan,
Iran
E-mail: amiri_tmu@yahoo.com

Abstract

Introduction: Attention Deficit/Hyperactivity Disorder (ADHD) is a prevalent childhood disorder that affects millions of children worldwide. This neurodevelopmental disorder is characterized by symptoms such as inattention, hyperactivity, and impulsivity, which can significantly impact a child's daily functioning and academic performance. This article focuses on the effectiveness of behavioral training for mothers of boys with ADHD. The study examines how training sessions can reduce parenting stress, decrease externalizing behaviors, and improve behavioral functioning in children with ADHD. The importance of this research lies in the fact that ADHD and externalizing problems are among the most common childhood disorders, making it crucial to find effective interventions that can support both parents and children in managing these challenges. By providing evidence-based behavioral training to mothers, the study aims to enhance parental skills in dealing with ADHD symptoms and promote positive behavioral outcomes in children.

Method: This study utilized a quasi-experimental design with pre-test and post-test measures and a control group. The participants were male students with ADHD (Combined type) and their mothers. The sample consisted of 30 mothers who were selected through convenience sampling and divided into experimental and control groups. Data was collected using the Children Adaptive Behavior in Home Questionnaire (1993), the Child Behavior Checklist (2001), and the SNAP-IV (1994). Both groups completed the Child Behavior Checklist and Children Adaptive Behavior in Home Questionnaire. The experimental group received nine ninety-minute sessions of parental behavior training while the control group continued with their usual routines. As for the experimental group, they were trained using Barkley's Parent Training Program (1997). Barkley's Parent Training Program is a behavioral program designed to educate parents and has been shown through empirical evidence to be effective in reducing behavior problems in children with ADHD or Oppositional Defiant Disorder (ODD). After the training, both groups completed the same questionnaires as post-tests. The obtained data was entered into SPSS-16 and analyzed using t-test and analysis of covariance.

Results: The study found that Barkley's Parent Training Program was effective in reducing behavior problems in children with ADHD. Specifically, it improved their behavior at home and decreased their aggression. The program was particularly effective for children whose mothers participated in the experimental group compared to those in the control group. The results were statistically significant, with a p-value of 0.001 for improving the behavior of children at home and 0.05 for aggression reduction.

Conclusion: The current study suggests that Barkley's parental training is an effective way to enhance the self-control of children with ADHD. This can be achieved by altering the way parents interact with and model behavior for their children with ADHD. As a result, it led to a decrease in behavioral issues and aggression among children with ADHD.

Keywords: ADHD, Behavior Parent Training, Maladaptive Behavior, Aggression

Introduction

ADHD is a neurodevelopmental disorder that mainly affects children and is characterized by symptoms of inattention, impulsivity, and hyperactivity. It's actually the most common neurodevelopmental disorder among kids [1]. According to studies, ADHD has a global prevalence of approximately 7.2% [2].

Clinical descriptions of children with attention deficit/hyperactivity often include the complaints that children do not obey, do not complete a given task, and are devoted to fantasy, lose their stuff and without completing one activity do another one and so on [3]. Many kids with ADHD actually show behaviors like being oppositional, defiant, aggressive, and having conduct issues, alongside the usual symptoms of the disorder [1]. Moreover, having children with ADHD places added responsibilities on their parents within the family, resulting in higher levels of stress and psychological issues for the parents. The evidence actually suggests that the demands and care needed for these children create a burden for parents, which can disrupt their everyday parenting routine and have a negative impact on their ability to fulfill their parental roles effectively [4]. Another issue that kids with ADHD often face is their tendency towards aggressive behavior. In various studies, it has been found that the way parents behave can actually contribute to worsening these behavioral problems and aggressive tendencies in these children [5].

There have been various approaches suggesting to address the behavioral challenges and aggressive tendencies exhibited by children with ADHD. These methods generally fall into two categories: medical treatments and psychosocial interventions [6]. However, research indicates that while medical and pharmaceutical treatments can help alleviate ADHD symptoms in children, their effectiveness is significantly enhanced when combined with psychosocial interventions. Many experts recommend starting with behavioral interventions and parent training before considering drug therapy; then if there's no sufficient improvement, then medication can be considered [7].

Among the psychosocial treatments that have proven effective in reducing behavioral problems in children with disorders like ADHD, parental behavioral training stands out as a crucial one. Conversely, studies reveal that parents of children with ADHD often struggle with knowing how to interact constructively with their kids. This often leads to behaviors that worsen the children's behavioral issues and consequently increase parental stress. Previous research has shown that parents of these children tend to display more passive behaviors [8] or resort to physical discipline [9, 10] more frequently than parents of normal children. Additionally, these parents may unknowingly exacerbate the children's behavioral problems by displaying controlling or neglectful behaviors [11], resulting in less warmth in their interactions [12, 13].

Taking all this into account, various research findings highlight the significance of parent training programs in not only reducing the core symptoms of ADHD but also addressing behavioral problems, enhancing attachment between parents and children, improving social skills, and promoting more positive behaviors both at home and in the classroom setting [7].

A gap in the existing research on parenting education for children with ADHD has been the lack of focus on the impact of these trainings on reducing aggressive behavior in these children. Previous studies have mainly examined the effects of education on general and non-specific variables, such as overall improvement in children's behavior [14] or variables with similar descriptions [15]. When more specific problematic behaviors have been targeted, the primarily considered variables have mostly included constructs such as these children's externalizing behaviors or their hyperactivity [16], attention deficit, [16] and social skills [17]. The specific effect of these trainings on reducing aggressive behavior has not been extensively explored in previous research. However, aggression is a particularly important issue to address in children with ADHD, as they are more likely to exhibit aggressive behavior than their peers without ADHD. It is safe to posit aggressive behavior can lead to negative outcomes for the child, including social rejection, academic difficulties, and even legal problems in extreme cases. It can also create stress and strain within the family, leading to a negative impact on the parent-child relationship [14].

One effective intervention for reducing maladaptive behaviors in children with ADHD is parenting behavior training, and numerous studies have demonstrated its effectiveness in alleviating symptoms in these children [16]. Parenting training programs are designed to equip parents with behavioral techniques that promote desirable behaviors and minimize or eliminate undesirable behaviors in their children. These programs are primarily based on learning theories and operate on the principles of operant conditioning. Previous research has examined the impact of various educational programs on reducing maladaptive behaviors in children with ADHD [14].

In the present study, we utilized the Barkley Behavioral Parenting Training Program. This program allows parents to quickly learn and implement techniques, yielding tangible and measurable outcomes in terms of reducing behavioral problems in children. Given that many parents of children with ADHD frequently express concerns about their children's aggressive and disruptive behavior both at school and at home, and considering the proven effectiveness of positive parenting programs in diverse cultural and linguistic contexts, this study aimed to evaluate the impact of training mothers of children with ADHD using Barkley's Parent Training Program. The goal was to examine whether this program can effectively reduce aggression and maladaptive behaviors in their children.

Method

The research targeted mothers of students diagnosed with ADHD in Azna city, located in western Iran in 2021. To form the sample group, 150 male students who

displayed potential symptoms of ADHD were identified based on teacher interviews. Subsequently, the mothers of these 150 students completed the SNAP questionnaire [18], and clinical interviews were conducted with them, aligning with the criteria outlined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders [19]. From this initial pool, 75 mothers were selected, focusing on those whose children exhibited the most pronounced symptoms.

In the following stage, additional criteria were applied to ensure a homogeneous group, resulting in the final selection of 30 mothers who met specific characteristics. These criteria encompassed mothers and children who had not previously participated in any behavioral training interventions, as well as mothers within the age range of 31 to 40 years. The children's ADHD diagnosis had to be categorized as the combined type, and all participating parents were required to belong to two-parent families. Additionally, it was determined that any mother absent for more than one session would be excluded from the study. Of course, no mother was subject to this rule and none of the mothers missed more than one session. The 30 chosen mothers were then randomly divided into two groups: an experimental group and a control group, each group consisting of 15 individuals.

Both groups underwent a pre-test to assess children's aggressive behavior and behavioral performance at home using the Children's Disease Questionnaire and the Children's Behavioral Performance Questionnaire. Subsequently, the experimental group received training consisting of nine sessions, followed by post-training measurements of the mentioned variables. The training program was adapted from Barkley's Behavioral Parent Training Program (1997) [20], which is rooted in the behavioral approach and behavioral therapy. It's worth noting that the training took place at Azna's Center for Learning Disabilities. The sessions included informative lectures by the instructor, practical exercises performed by the attendees, and assigned homework for participants to complete at home.

Each session focused on different aspects of training. In the initial session, participants were provided with information about the nature, prevalence, course, prognosis, etiology, and treatment of behavioral problems in children with ADHD. The second session covered general principles of behavior management, including topics like positive reinforcement and differential reinforcement. Teaching on the principles of attending to positive behavior and ignoring inappropriate behavior took place in the third session. The fourth session delved into positive attention to adaptive behaviors such as obeying parental commands and following family rules. The fifth session introduced the concept of a token economy. The sixth session focused on teaching the use of time-out and response-cost methods. The seventh session emphasized behavioral management in public settings. In the eighth session, participants learned about recording positive behaviors displayed by their child at home and scoring these behaviors accordingly. Finally, the ninth session served as a brief overview of the covered topics and discussed strategies for addressing future issues. This comprehensive training program aimed to equip parents with effective tools and techniques for managing their child's behavior and promoting positive outcomes.

The following instruments were used in this study:

SNAP-IV: The questionnaire utilized in the study consisted of 26 items that corresponded to criteria of the DSM-IV for ADHD and symptoms of Oppositional Defiant Disorder (ODD). Parents were asked to rate their children's behaviors related to inattention [items 1-9], hyperactivity-impulsivity (items 10-18), and defiance [items 19-26] using a 4-point Likert scale, ranging from 0 (not at all) to 3 (very much). The scores were calculated using three different scoring methods. The first scoring method followed a more traditional approach, where the total score for each dimension was obtained by averaging the scores of the individual items. In the case of inattention and hyperactivity-impulsivity, the sum of the scores was divided by nine, while for ODD symptoms, it was divided by eight. The second scoring method involved summing up the scores of the items within each dimension, resulting in a raw score ranging from 0 to 27 for inattention and hyperactivity-impulsivity, and from 0 to 24 for the dimension of ODD. The third scoring method entailed categorizing each item of the SNAP-IV questionnaire as present or absent. Items scored as 0 (not at all) and 1 (just a little) were considered absent (0 points), while scores equivalent to 2 (quite a bit) and 3 (very much) were considered present (1 point). This method yielded a maximum score of 9 for inattention and hyperactivity-impulsivity, and 8 for the dimension of ODD. These different scoring approaches allowed a comprehensive assessment of the children's behaviors and symptoms, enabling researchers to gain valuable insights into their levels of inattention, hyperactivity-impulsivity, and ODD [21].

The Child Behavior Checklist (CBCL; Achenbach, 1991)[22]: This questionnaire contains 112 items about children's special problems, and parents should specify their child's status in each item by choosing one of three options: "false = 0", "somewhat true = 1" and "completely true = 2" . In this list, the factor "externalizing problems" was created from the sum of the scores of the two factors "law breaking" and "aggressive behavior". In this research, only the scores related to the law-breaking behavior subscale were used. The reliability and validity of this questionnaire are acceptable according to Cronbach's alpha and are in the range of 0.65 to 0.85. Considering the small number of questions, the alpha values are at the expected and satisfactory level. The alpha coefficients of CBCL scales and subscales are between 0.87 (for externalizing scale) and 0.73 (for social problems). The test-retest validity (between 5 and 8 weeks) also showed that all correlation coefficients are significant at the $P<0.05$ level and between the range of 0.97 (for the externalizing scale) and 0.38 (for the thinking problems scale)[23].

Children Adaptive Behavior in Home Questionnaire (1993): This questionnaire developed by Swanson (1992)

is utilized to assess the expected behaviors of all children in a home environment, including those with ADHD. The questionnaire consists of 10 items with a six-point Likert scale ranging from "never" to "always". Its purpose is to evaluate functional behavioral difficulties and problems in children with ADHD [24]. The questionnaire was developed based on an analysis of behavioral problems specifically within the home setting. Some examples of the questionnaire items include statements such as "remaining quiet when necessary" and "staying seated when required". This questionnaire has been employed in various research studies to investigate the impact of medical and psychological interventions on children with ADHD. Its validity and reliability have been confirmed through studies. For instance, in a study conducted by Murray et al. [25] the scale demonstrated a reliability coefficient of 0.98, and in McBurnet's research, the internal consistency of the scale was reported as 0.94 [26].

Results

This research involved 30 mothers who were divided into an experimental group and a control group. Data was collected from these participants. The educational level of the parents was utilized as an indicator of their socioeconomic status. The average age of children in the experimental group was 11.3 years [SD = 2.2], while in the control group it was 11.0 years [SD = 2.5]. Parents in the experimental group had an average age of 38.8 years [SD = 4.6], whereas parents in the control group had an average age of 39.1 years [SD = 4.5]. On average, children in the experimental group had 3.5 siblings [SD = 2.5], while those in the control group had 4.0 siblings [SD = 1.5]. In terms of family economic status, the monthly income varied between 100,000,000 Rials and 150,000,000 Rials for each family, with an average income of 125,000,000 Rials for the experimental group and 115,000,000 Rials for the control group.

Descriptive results of the study, in either pre-test or post-test, are presented in Table 1.

Table 1 displays the means of both groups in the pre-test phase, which showed no significant differences. However, notable discrepancies emerged in the post-test phase after implementing the independent variable. Given the study's pre-post-test design with a control group, analysis of covariance was utilized to examine the data and control for the pre-test effect. Specifically, analysis of covariance was conducted to explore the impact of behavioral parent training on reducing aggression and promoting adaptive behavior at home among children with ADHD. The results of each analysis are presented separately in the tables below.

This type of analysis relies on certain assumptions, such as the homogeneity of regression slopes between the random variable (pre-test) and dependent variables. In this study, the slopes of the regression lines were generally parallel across all variables, except for aggression ($F=7.361$, $P<0.05$).

However, for the interaction between group and pre-test concerning children's adaptive behavior at home, the result was not statistically significant ($F=0.248$, $P>0.05$), indicating that this assumption was met. Another assumption of this analysis is the homogeneity of variances. To assess this assumption, Levene's test was employed to examine the variances of the two groups in the pre-test and post-test stages.

The results of the Levene test demonstrated that the variances were not significantly different, except for aggression ($F=13.66$, $P<0.05$). In terms of post-tests, the adaptive behavior at home did not show significant differences ($F=2.16$, $P>0.05$). Therefore, the assumption of homogeneity of variances was confirmed. With these assumptions fulfilled, we were able to proceed with the analysis.

To address the first research question, a gain score method was implemented since the assumption of the homogeneity of gradients was not met to conduct the covariance test. In the gain score method, the post-test scores were subtracted from the pre-test scores, and the results of the experimental and control groups were compared using an independent t-test."

Table 2 illustrates that the mean score of the experimental group is noticeably higher than that of the control group. To determine whether the difference between the two groups was statistically significant, an independent t-test was employed.

Table 1. Mean and Standard Deviation Scores in Pre-test and Post-test

Dependent variables	Experimental				Control			
	Pre-test		Post-test		Pre-test		Post-test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Aggression	18.66	2.38	11.83	4.83	18.08	2.12	17.83	1.26
adaptive behavior	27.33	2.91	33.83	2.28	26.08	2.27	25.91	2.69

Table 2. Descriptive Indices of the Gain Score for Aggression in Experimental and Control Groups

Group	Frequency	M	SD
Experimental	15	6.83	4.01
Control	15	0.250	2.26

Table 3. Comparison of Pre-test and Post-test Scores in Aggression among Groups

Group	Levene Test		Mean Difference	T	Df	P
	F	P				
Experimental Control	1.68	0.527	6.58	4.94	28	<0.05

Table 3 indicates a statistically significant difference between experimental and control groups in aggression scores (P=0.05 and t= 4.94).

Based on the findings presented in Table 4, there were notable and statistically significant differences observed in the average scores of aggressive behaviors between the experimental and control groups (F(1, 27) = 77.54, P = 0.001). These results indicate that after the post-test, parents who received behavioral training exhibited a decrease in aggression among children with ADHD compared to the control group. Consequently, it can be inferred that parent's behavioral training has had a demonstrable impact on both groups, inducing positive changes.

Table 4. Results of Covariance Analysis for 'Adaptive Behavior at Home' Variable

Source	SS	Df	MS	F	P
Pretest	89.196	1	89.196	8.61	0.05
Group	780.547	1	780.547	77.54	<0.001
Error	211.38	27	8.46		
Total	25537	30			

Discussion

The aim of this study was to examine how parenting training can help parents of children with ADHD effectively address their kids' aggressive and non-compliant behaviors. The research findings revealed that when mothers received parenting training, it significantly reduced the symptoms of aggression and maladaptive behaviors in children with ADHD. These results align with numerous studies that have demonstrated the positive impact of parenting training on mitigating behavioral issues in children, specifically those with ADHD [14-17].

One explanation for this finding is that, without proper behavioral training, parents may instinctively resort to ineffective approaches like excessive control, negative attention, or neglect when trying to handle the challenging behaviors of their hyperactive children. Unfortunately, these methods tend to worsen the ADHD problems rather than alleviate them. Barkley (1990)[27] proposed that the core of ADHD lies in response inhibition and behavior, indicating that these children struggle with delaying their responses to stimuli. Parental behavioral training proves effective as it aligns with the principles of operant conditioning, offering negative consequences for undesirable behavior and positive consequences for adaptive behavior. This highlights the importance of response inhibition in addressing the difficulties of children with ADHD.

Moreover, conducting parent training in a group setting has significant advantages, primarily in terms of altering parents' attitudes. This occurs when parents engage with other mothers facing similar challenges with their ADHD children and gain a deeper understanding of the disorder. Through these sessions, mothers come to realize that many behavioral problems experienced by their children are shared by others with the same condition. Consequently, they are able to let go of any feelings of inadequacy or incompetence as parents. This shift in mindset can have numerous positive effects on the interaction between parents and their children.

Another valuable aspect of parental training is its ability to influence the self-perception of children who struggle with behavioral issues. Children with ADHD often have an unfair perception of the world and tend to have low self-esteem [28]. However, by equipping parents with skills such as providing encouragement, dedicating time for their children, and increasing their responsibilities, parenting training programs enhance the sense of acceptance within the parent-child relationship and ultimately bolster the children's self-concept. Additionally, the research findings revealed that effectively teaching parents reduces the aggressive behavior displayed by children with ADHD. Behaviors like impulsivity and aggression can strain the child-parent relationship and place significant psychological pressure on the parents. Therefore, parent training programs serve as highly effective strategies that directly contribute to managing these undesirable behaviors.

Conclusion

This study examined the effectiveness of behavioral training mothers on boys with ADHD. While this research yielded significant findings, it is important to acknowledge that, like any other study, it had some limitations that should be noted. The employed methodology, including the tools and sample group, may restrict the generalizability of the results to other methods and populations. It is worth mentioning that the study design, being quasi-experimental, did not allow for random assignment as would be possible in controlled experimental studies, which affects the ability to establish definitive causal relationships. Therefore, it is recommended that future research endeavors to address these limitations.

To further enhance the understanding of these children's issues and facilitate their improvement, it is suggested to conduct meetings involving other individuals who have close relationships with the child, such as fathers and teachers. This can provide a more comprehensive perspective and contribute to identifying and addressing the problems these children face to the best possible extent.

Conflict of interest

The authors declared no conflicts of interest.

Ethical Considerations

In this study, all ethical considerations was fulfilled. Participants were explained about the trend and goals of the study. An informed consent was obtained from all participants. In addition, all information has been kept confidential.

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