

The Effectiveness of Coping Skills Training on Emotional Self-Regulation of Children with Attention Deficit Hyperactivity Disorder

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ABSTRACT

Background and Objective: Multiple disabilities are associated with attention deficit hyperactivity disorder (ADHD), some with single disabilities, while others involve multiple deficits, while others display no specific impairments. This study aimed to examine how coping skills training affects emotional self-regulation in children with ADHD.

Methods: In this study, a quasi-experimental design was used with pretests, post-tests and a control group. From October to December 2019, all pediatric ADHD patients attended the Armaghan Pediatric Clinic of the Razi Psychiatric Hospital in district 4 of Tehran, Iran were studied. Totally, 28 of them were chosen for the study using a purposive sampling method. Both groups were randomly divided into two experimental (n=14) and control (n=14) groups. The experimental group received 12 ninety-minute sessions of therapy once a week, while the control group did not receive treatment. The study instruments were a questionnaire on demographic features and the Emotion Regulation Questionnaire (ERQ). For data analysis, SPSS 21 was used to conduct an analysis of covariance (ANCOVA).

Findings: Twenty-eight children aged 7-12 were evaluated for ADHD (mean=8.13±1.20) whose diagnoses met the diagnostic criteria. The results revealed that coping skills training made significant changes in emotion regulation in pre-test and post-test in experimental group were 13.53±2.446 and 14.00±2.299 and in control group 13.40±2.098 and 13.40±1.920, respectively (P<0.001).

Conclusion: The findings of this study demonstrated that coping skills training for children with ADHD resulted in improved emotional self-regulation.

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Introduction

Children living in vulnerable situations can benefit from mental health programs that increase their emotional and mental health. The ability to regulate one's behavior can be regarded as one of the most complex and fundamental executive functions [1]. It is critical to healthy development and adequate academic achievement. Emotion regulation (ER) is a thought process that involves emotions and cognition [2]. A popular model that describes emotional self-regulation (ER) is Gross's. The models recommend that ER strategies be identified, selected, introduced, and evaluated for effectiveness. In other words, ER refers to the ability to control our emotions, such as expression, timing, and intensity. In the Research Domain Criteria Initiative (RDoc) of the National Institute of Mental Health (NIMH), ER can be viewed as an additional sixth factor that represents interactions between the other five domains [3, 4]. The field of psychology has recently revealed that 40% to 70% of mental disorders involve dysregulated emotions. Attention-Deficit/Hyperactivity Disorder (ADHD) is one of those conditions [5].

Researchers have increasingly revealed that emotion dysregulation should be considered a prominent feature of (ADHD) in both childhood and adulthood. It has been established that exaggerated emotions and symptoms of ADHD can lead to emotional difficulties [6]. Children with ADHD who are hyperactive and emotionally dysregulated are more likely to struggle with the oppositional defiant disorder, depression, and dysthymia than children who are well-behaved and not hyperactive [6]. A growing body of research indicates that ED is a developmental disorder related to emotion regulation. There are often links between ED and internalizing disorders as well as externalizing disorders, which may indicate that it may be a common risk factor for psychopathology [7]. The cognitive effects of ED are significant, but so are the social effects, and impulsive behavior and irritability often hinder recovery and the need for interventions for years [8]. In addition, ED has been identified as likely to predict risky behavior in adolescents with attention deficit hyperactivity disorder, such as substance abuse, especially

amphetamines and cannabinoids, as well as addictive behaviors, self-harm, and suicide [9, 10]. In addition, in young drug-naïve adults with ADHD, ED is a negative predictor of the short-term response to methylphenidate monotherapy, especially for hyperactive-impulsive symptoms, so it should be systematically assessed at baseline [11].

The treatment of attention deficit hyperactivity disorder (ADHD) with medicine alone is not sufficient. For kids with ADHD, there are a variety of effective treatments that can help them become more attentive, manage their hyperactivity, and control their impulsive behavior. Including nutritious meals, exercise, and playtime in a child's daily schedule can enhance their academic performance, improve their relationships with others, prevent stress, and reduce frustration. Among the executive function skills, coping skills are the cognitive, emotional, and behavioral responses a person uses to deal with stressful situations. A child lacking impulse control becomes easily angry, may not control their level of anger, and may respond exaggeratedly without fully developing coping skills. Several environments can result in recurring anger crises, including the home and school [12]. As a part of the Coping Skills Training Program (CSTP), parents of children with developmental disabilities receive support and skills development. As part of this treatment program, patients undergo training in problem-solving, personal goal-achieving, interpersonal skills, and cognitive restructuring. Upon receiving positive results, parents should set behavior-measurable and realistic expectations. Furthermore, the authors suggest that parents can benefit from adopting a behavioral approach to acquire skills for situations in which they are unprepared [13].

For the first time, the Coping Skills Training Program was implemented directly on children rather than through their parents. The previous study by Ergüner-Tekinalp and Akkök revealed differences in hopelessness levels and social support as coping strategies. However, there were no significant differences between mothers' stress levels and avoidance and problem-solving as coping strategies. Moreover, the interviews with mothers of children who have autism suggest that the program

has been beneficial to them [14]. Ilik (2021) investigated the impact of attention and coping skills training on improving the attention and coping skills of inclusive students with ADHD. Study findings indicated that the pretest scores for anger accusation, avoidance, and positive coping were significantly different from the post-test scores. It has been found that training affected children's coping skills positively [12]. Currently, there are no well-established models or theories to explain how emotional deficits in ADHD occur. A lack of research has been conducted on improving emotional and regulating skills in children and adults with ADHD. In general, the limited research available has been the study to conduct this research. This study examines whether training in coping skills can help children with ADHD regulate their emotions.

Methods

Study design and participant

This quasi-experimental study was performed with pretests, post-tests, and a control group. The Armaghan Pediatric Clinic of the Razi Psychiatric Hospital located in Tehran, Iran, was involved in a quasi-study on 28 children's study [15]. Researchers estimated that each group would require 17 children with ADHD. In this study, the sample size was determined using the formula for determining the sample size of independent groups, in which the values were used instead of Z, S, and M.

$$N = \frac{Z^2 (1-\alpha/2) + z^2 (1-\beta) \times (s_1^2 + s_2^2)}{(m_1 - m_2)^2} = \frac{(1.96+1.28) \times ((4.02)^2 + (2.83)^2)}{(11.55-14.6)^2} = 20$$
 However, contrary to the calculation of the formula, 34 people were chosen according to the entry criteria and the absence of a sample, and then 28 people were selected. The inclusion criteria were children with ADHD diagnosis confirmed by a psychiatrist, at least six months after diagnosis, aged 4 to 12 years, not suffering from another mental health condition (conduct and mood disorder and mental retardation, and also, do not suffer from anxiety disorders), and no long-term medical conditions (cardio and renal disease, epilepsy, cancer, cerebral palsy); children who are completely

satisfied with their training and their parents. The exclusion criteria included having a major psychological disorder and being unsatisfied to participate in the training session.

Intervention

After considering the above criteria, a sample of 28 children was selected and randomly divided into two groups of experimental and control (each 14 children). In the present study, the intervention was implemented for two months after the necessary coordination with the Armaghan Pediatric Clinic of the Razi psychiatric hospital located in Tehran, Iran, and each session lasted 90 minutes. The program was designed for ADHD students in 2002 by Julie Alexander at Denver State University [12]. Coping skills training programs (administered by two authors in this study) were taught in ten components. It included illustration, deep breathing, practicing problem-solving steps, passive and bold ambitious answers, control beliefs, failure documents (failure explanation), logical and irrational thinking, sentences, therapy, goal setting and group feedback on individual progress as well as the application of skills during 12 sessions were as follows. No training was provided for the control group. Both groups were evaluated after completion of the intervention, and the findings were used as a criterion for training progression. In addition to the consent of parents and children, all personal information was considered confidential. Additionally, children were assisted by their parents when filling out the questionnaires. Post-test assessments were carried out for both groups after the intervention. Following the implementation of sessions, coping skills training methods and techniques were taught to the experimental group for 12 sessions (training sessions of emotion regulation skills were conducted once a week for 2 months) and during this period no psychological training was given to the control group. The participants tried to fill out the questionnaire after 12 training sessions on emotional regulation. It should be remembered that the researcher worked closely with the participants at all stages of the study and responded to all possible problems. Table 1 provides a summary of the training sessions' content [12]. It should be noted that two briefing

sessions were held for them to better match children (gender, age and education).

Statistical Analysis

A descriptive (Mean±SD) and inferential (Analysis of covariance (ANCOVA), and Box's M test for equality of covariance matrices) statistics were performed using SPSS 21.

Instrument

Emotion Regulation Questionnaire (ERQ): A total of 36 items measure cognitive aspects of emotion regulation (16 items). In the ERQ, individuals are asked to answer a set of multidimensional questions to determine their

cognitive strategy and style after being exposed to an event. Healthy and clinical populations of different ages can be tested using it. This device is suitable for children ≥ 6 years old. Each item is rated on a Likert scale ranging from 1 (almost never) to 5 (almost always). In the original version, Cronbach's alpha ranged from 0.84 to 0.772 [16]. Add together the scores of subscales associated with a particular cognitive emotion regulation strategy (between 4 and 20 points). A higher score indicates a more effective strategy. According to the Iranian version, Cronbach's alpha ranged between 0.64 and 0.82 [17]. The Cronbach α of the questionnaire in the current study was 0.68.

Table 1. Coping skills training program

Sessions	Content
1	In the first session, the group was taught the importance of learning coping skills that lead to the selection of new methods and better learning in school and their relationships with other students. Express the concept of the problem and create sensitivity to the problem. Discuss reactions to the concern.
2	Progressive relaxation training based on imaging and deep breathing: During the second session, it was taught to hyperactive children as coping skills in the face of problems.
3	Learning to practice problem-solving steps: During the third session, introduce the problem-solving guide, which includes: identifying the problem or problem, focus, alternatives, choosing the best solution, evaluation, i.e. using a coping statement to choose good or bad.
4	Teaching ambitious, passive and assertive responses: During the fourth session, a scenario was designed and aggressive, passive and assertive responses were taught.
5	Teaching Control Beliefs: During the fifth session, control beliefs based on responsibility for their behavior were taught how to change attitudes and motivate their lives and control.
6,7	Failure documents training (failure explanation): During the sixth and seventh sessions, stable and unstable failure documents were taught.
8	Logical and irrational thinking training: During the eighth session, logical and irrational thinking was taught in the form of logical and irrational sentences.
9	Teaching sentence sentences: During the ninth session, self-talk in the form of negative, positive and therapeutic sentences
10	Timing training: During the tenth session, the right time and the wrong time to do an activity
11	Goal-setting training: During the eleventh session, the goal-setting activity is based on an issue plan using individual means-goal thinking
12	Group feedback on individual progress and application of skills during this feedback session
Follow up	The follow-up session provided a brief overview of the concepts taught in groups during these sessions.

Results

Among the 34 participants recruited for this study, six participants declined to participate in the study due to exclusion criteria. Consequently, statistical data analysis was performed on the data collected from 28 participants. Both the intervention and the control groups were homogeneous in age

and gender (table 2). Twenty-eight children aged seven to twelve were evaluated for ADHD (mean=8.13, SD=1.20) whose diagnoses met diagnostic criteria. Based on the results depicted in table 2, in the coping skills training group, both groups from age ($\chi^2=14.211$, $P=0.019$) and level of education ($\chi^2=1.152$, $P=0.406$) are homogeneous.

However, no significant variations were observed among the two groups.

As shown in table 3, there is a significant difference between the pretest and post-test scores of emotional self-regulation in the experimental group ($p < 0.05$). Consequently, it is found that coping skills training has a positive effect on ADHD children. Moreover, Box's test results to check the default homogeneity of variance-covariance matrix emotional self-regulation showed that the value of the significance level ($p > 0.01$)

indicates that the condition of homogeneity of the variance-covariance matrix is well observed ($F = 0.136$ and $p > 0.01$). In this study, results showed that there is a significant difference between experimental and control groups in terms of emotional self-regulation after the intervention (Sum of square=136.241, $DF=1$); ($F=45.141$, $p=0.001$). An independent variable in the study explains 62% of the changes in the experimental group.

Table 2. Demographic features of the participants in the two research groups

Variables	Group	Experimental	Control	χ^2	P
Educational status	First and second grade	3	4	1.152	0.406
	Third and Fourth grade	7	7		
	Fifth and Sixth grade	4	3		
Age Group	7-9	3	4	14.211	0.019
	10-11	7	7		
	12	4	3		

Table 3. Pretest-Posttest results of coping skills training

Variables	Sub-groups	Groups	Mean±SD	Min	Max
Emotional Self-Regulation	Experimental	Pre-test	13.53±2.446	36	60
		Post-test	14.00±2.299	43	60
	Control	Pre-test	13.40±2.098	34	60
		Post-test	13.40±1.920	40	60

Discussion

This study investigated the effects of coping skills training on emotional self-regulation in pediatric ADHD. Moreover, our study showed coping skills are effective for emotional self-regulation after the intervention. Compared with the baseline, intervention group values had increased significantly.

The present study found similar results to those found in previous studies that examined operant conditioning and cognitive methods for treating ADHD Ilik, [12]; Leitch [18]; Hampel et al. [19]; Carroll and Hirvikoski [20]. Adolescents' emotional regulation plays a significant and determining role in their mental health; effective performance is dependent on it; adaptation to events, stress and harassment are criminal behaviors.

Emotion regulation helps people to regulate negative arousal and emotions and by using adaptive strategies, they cause impulses, empathy, social responsibility and flexibility, which are

important factors in criminal behaviors. One of the most significant strategies in regulating emotions and subsequent criminal behaviors in adolescents is teaching coping skills [21]. According to Craig et al.'s study on the development of coping skills among children, those with ADHD have more difficulty managing their coping skills and these problems negatively affect other aspects of their development [22]. Hampel et al. [19] found coping problems among children with ADHD. Another study confirmed that children with ADHD's coping difficulties are a significant factor in their families' stress levels [18]. Studies have found that ADHD children experience more difficulties than their peers. Several studies have shown that children's coping concerns negatively affect their lives as well as their family members' lives. Academic achievement, attention, life satisfaction, and problem-solving skills are associated with coping skills [23, 24]. In addition, caregivers of those with emotion dysregulation tend to report high levels of

distress and psychological burden [25]. In addition to social exclusion, perfectionism, and interpersonal distrust, other interpersonal difficulties may be associated with emotional dysregulation, such as social exclusion [26], perfectionism [27], and interpersonal distrust [23, 28]. Research has shown that emotional skills are fundamental to good psychological functioning, and ineffective coping mechanisms can cause disorders. This becomes very important in the development of other social difficulties [29]. Regulation of emotion can be defined as the ability to change one's emotional state in order to promote purposeful behavior, and humans can use a wide range of more or less successful strategies to regulate their emotions [30].

In addition, emotional impairments negatively influence social and family life, work, education, driving, finances, and organizing [22, 31]. Explaining this finding, by understanding positive and negative emotions, accepting them, and expressing them appropriately, emotion regulation can play an important role in reducing anxiety. Since the main focus is on positive and negative emotions and their reinforcement and also the emotional processes of adolescents in this system may affect their cognitive system, so by knowing the awareness of these emotional processes, the cognitive system of these people can be corrected. Based on the literature review, no research has been done related to children's emotional self-regulation and coping skills training. Hopefully, future research will shed light on this topic. By noticing the reflections on a computer program, the child with ADHD demonstrated a strong generalization of the study. Therefore, because emotional self-regulation was not the only problem of a child with ADHD, it is thought that further research should be conducted in order to examine other executive functions in children with ADHD.

Limitation

The study we conducted has several limitations. A convenience sample cannot be generalized to other populations. Moreover, since the Participants were selected from Armaghan Pediatric Clinic, a psychiatric hospital in Shahr-E-Ray, Tehran, it is not possible to generalize the findings to the general population, including adults and children.

Differences in parental education (culture, education levels, etc.) might also affect outcomes. Randomization and control groups were used to minimize these differences.

Conclusion

Based on the results of this study, Coping Skills Training for children with ADHD has shown to be effective in increasing their emotional self-regulation.

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Ethical approval:

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Conflict of interest

The authors declare that there is no conflict of interest.

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