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Effects of Narrative Therapy and Computer-Assisted Cognitive Rehabilitation on the Reduction of ADHD Symptoms in Children

S.O. Emadian (MSc)[1], H. Bahrami (PhD)[1*], R. Hassanzade(PhD)[2], Sh. Bani-Jamali (PhD)[3]

1.Department of Educational Psychology, Islamic Azad University, Science and Research Branch, Tehran, I.R.Iran

2.Department of Psychology, Sari Branch, Islamic Azad University, Sari, I.R.Iran

3.Department of Psychology, Alzahra University, Tehran, I.R.Iran

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ABSTRACT

BACKGROUND AND OBJECTIVE: Attention deficit/hyperactivity disorder (ADHD) is the most common neurobehavioral condition in children, which adversely affects the psychological function of children in educational, social, and emotional areas. Use of non-pharmacological treatment methods, such as narrative therapy and computer-assisted cognitive rehabilitation, is necessary for ADHD patients due to lack of side effects and concerns regarding medication therapy. This study aimed to evaluate the effects of narrative therapy and computer-assisted cognitive rehabilitation on the symptoms of ADHD in children.

METHODS: This quasi-experimental study was conducted in Sari, Iran during June-February 2015 using the pretest-posttest approach with a control group. In total, 30 children aged 7-12 years diagnosed with ADHD were selected and divided into three groups. Children of the first group received eight sessions of narrative therapy, while the second group received 10 sessions of computer-assisted cognitive rehabilitation, and the third group received no training. Data were collected using the Raven's colored matrices, Conners' Parent Rating Scale (CPRS-48), and CogniPlus software.

FINDINGS: Mean post-test scores of ADHD symptoms were 20.1±5.21 and 20±3.55 in the narrative therapy and computer-assisted cognitive rehabilitation groups, respectively; however, no significant difference was observed between the groups in this regard. Moreover, these scores were 37.4±9.84 and 38.95±9.06 in the control group, which showed a significant difference compared to the experimental groups ($p<0.05$).

CONCLUSION: According to the results of this study, narrative therapy and computer-assisted cognitive rehabilitation could remarkably reduce ADHD symptoms in children.

KEY WORDS: *Attention deficit/hyperactivity disorder, Narrative therapy, Computer-assisted cognitive rehabilitation.*

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* **Corresponding author: H. Bahrami (PhD)**
Address: Department of Educational Psychology, Islamic Azad University, Science and Research Branch, Tehran, I.R.Iran
Tel: +98 21 44865154
E-mail: bahramisrb@yahoo.com

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Introduction

Attention deficit/hyperactivity disorder (ADHD) is a common, chronic, debilitating disorder characterized by restlessness, inattention, and impulsive behaviors in children. This disorder leads to educational, behavioral, and emotional problems during childhood, while increasing the risk of accidents, anti-social behaviors, and school dropout in adolescence (1).

Although the genetic background of ADHD has been recognized, the main causes of this disorder remain unknown (2). Formerly, researchers assumed that ADHD is a unique condition occurring in childhood; however, recent studies are indicative of the persistence of this neurobehavioral disorder throughout life (3). Several studies have suggested that ADHD is associated with complications in executive functions and behavioral self-monitoring of individuals, which significantly decrease behavioral control (4).

Early diagnosis and proper treatment of ADHD are inherent to the effective management of this disorder. As such, previous studies have marked that management of ADHD compensates for the possible disabilities and enhances influential skills in children diagnosed with this disorder (5). According to the literature, treatment of ADHD mainly involves medication therapy. For instance, psychostimulants, such as Ritalin, are the most effective agents in the treatment of ADHD (6-8). Nevertheless, the efficacy and side effects of psychostimulants and role of medicines in the treatment of specific ADHD patient groups (e.g., elderly individuals) remain a matter of debate (9, 10). On the other hand, the majority of the parents of ADHD children are concerned about the use of such medicines (11, 12).

This concern could be attributed to the long-term consumption of psychostimulants and their potential side effects, including loss of appetite, sleep disorders, irritability, aggression, anxiety, and ticks and seizures in some cases (13, 14). Therefore, application of non-pharmacological methods in the treatment of ADHD seems necessary; such examples are narrative therapy and computer-assisted cognitive rehabilitation, which have been reported to cause no side effects in children. Narrative therapy is a therapeutic technique, which has numerous benefits in addition to the treatment of psychological problems in children. In this method, it is presumed that changes in the language and literature of life stories create new opportunities for the alteration of behaviors and communication skills in children (15). A narrative is a literary text encompassing secondary educational, cultural, and therapeutic applications (16). Assessment of the theories, studies, and clinical experiences confirms the therapeutic effects of storytelling on children.

In narrative therapy, stories facilitate the emotional expression in children, while improving the perception of children through creating new opportunities in order to change and enhance possible problems and disorders (17, 18). Today, narrative therapy is widely used in the treatment of children with special needs, such as those diagnosed with ADHD (19, 20). In a study, Javdan et al. reported that teaching stories to ADHD children plays a pivotal role in the reduction of hyperactive-impulsive behaviors. Furthermore, this method could contribute to the improvement of verbal, emotional, and cognitive skills and mental guidance of children (21).

In addition, narrative therapy based on executive functions could remarkably enhance inhibitory executive functioning and planning/organizational skills in children with ADHD (22). Computer-assisted cognitive rehabilitation is another effectual therapeutic approach used in the treatment of ADHD children (23). Relying on brain resilience and neuroplasticity, this approach causes synaptic stability in ADHD individuals through the successive stimulation of the less active regions of the brain (24). Computer-assisted cognitive rehabilitation encompasses various exercises, which are mainly focused on visual reactions, attention, pace of information processing, memory enhancement, and problem-solving skills.

These exercises not only increase flexibility and adaptability in therapy, but they also shorten the length of treatment (25). In this regard, findings of Amonn et al. confirmed the efficacy of computer-based neuropsychological training in the improvement of ADHD symptoms (26). The study by Sohrabi revealed that computer-assisted cognitive rehabilitation caused a significant, sustainable reduction in the clinical symptoms of ADHD. Moreover, this approach was reported to improve cognitive symptoms, while diminishing motivational and motor symptoms of this disorder (27). Similar to psychostimulants, computer-assisted cognitive rehabilitation increases the attention of ADHD children; however, the benefits of this approach are more sustainable compared to the use of stimulants (28). Moreover, computer-assisted cognitive rehabilitation enhances effective executive functioning and organizational skills in ADHD children (29). In

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general, numerous studies have confirmed the positive effects of computer-assisted cognitive rehabilitation on reducing the symptoms of ADHD (23, 30-33). ADHD adversely affects various aspects of functionality and normal development of the patients and their family. Considering the diversity of the associated problems in ADHD children and inefficiency of medication therapy, this study aimed to compare the effects of narrative therapy and computer-assisted cognitive rehabilitation on the reduction of ADHD symptoms in children in Sari, Iran.

Methods

This quasi-experimental study was conducted using a pretest-posttest design with a control group on all the children diagnosed with ADHD aged 7-12 years referred to the psychological and psychiatric clinics of Sari, Iran during June-February 2015.

Before the intervention, rate of ADHD signs and symptoms was assessed as the dependent variable (pretest). Afterwards, ADHD patients were divided into three groups that were homogenous in terms of gender, intelligence quotient, socioeconomic status of family, and severity of disease based on the objectives of the study. In the next stage, training sessions were carried out for two groups during three months. For the first group, training consisted of eight sessions of group narrative therapy (30-45 minutes), the second group received 10 sessions of computer-assisted cognitive rehabilitation through individual self-instructional training (30 minutes), and the third group received no educational interventions.

In order to assess the intelligence quotient of the subjects, we used the Raven's colored matrices. According to the results obtained by Sharifi, correlation-coefficient of this test based on the Binet and Wechsler tests is 0.4-0.72, and its reliability is confirmed at 0.70-0.90 for older ages, while it is slightly lower in younger subjects (33). In this study, we used the Conners' Parent Rating Scale (CPRS-48) for the diagnosis of ADHD in children. CPRS-48 consists of five main sections to assess conductive, learning, psychosomatic, impulsivity, and anxiety problems. In addition, another factor regarding the aspect of hyperactivity could be extracted from this scale. Reliability of this scale was determined at 0.71 via the split-half, odd-even approach, and the face validity has been confirmed by neurologists and psychiatrists (34). In this study, we used the CogniPlus software in order to implement computer-assisted cognitive rehabilitation. This software was first developed by Sturm et al. in 2004 in Austria for the training of basic cognitive functions, including sustained attention, direct attention, selective attention, working memory, vigilance, and visual-motor coordination. Concurrent validity was used to determine the validity of the CogniPlus software, and the obtained correlation-coefficient was estimated at 0.61 in 30 students. Reliability of the CogniPlus software was confirmed at the Cronbach's alpha of 0.91 (35). Data analysis was performed using descriptive (mean and standard deviation) and inferential statistics (one-way ANOVA).

Before data analysis with one-way ANOVA, we evaluated and confirmed the regression homogeneity, equality of variance, and normal distribution of data. In addition, post-hoc tests were used for the paired comparison of mean values. Dunnett's test was applied due to heterogeneity of variance across the groups, and P value of less than 0.05 was considered statistically significant.

Results

According to the results of this study, experimental groups had less ADHD symptoms compared to the control group. After narrative therapy, mean of ADHD symptoms in the test and control groups was 20.1±5.21 and 37.4±9.84, respectively. However, after computer-assisted cognitive rehabilitation, these values were 20±3.55 and 38.95±9.06 in the test and control groups, respectively. Mean score of the test group was significantly lower after the intervention compared to the control group, which suggests that ADHD symptoms decreased in children of the test groups compared to the control group (table 1). A significant difference was observed in the effectiveness of narrative therapy and computer-assisted cognitive rehabilitation in terms of the reduction of ADHD symptoms in children aged 7-12 years in Sari city. However, the results were indicative of no significant difference between the reduction of ADHD symptoms in subjects of narrative therapy and computer-assisted cognitive rehabilitation groups. Moreover, a significant difference was observed between the two test groups (narrative therapy and computer-assisted cognitive rehabilitation) and control group in terms of decreased ADHD symptoms in children aged 7-12 years in Sari city (table 2).

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Table 1. Comparison of mean and pretest-posttest scores of ADHD symptoms in narrative therapy and computer-assisted cognitive rehabilitation groups

Intervention Groups	Stage	Group	Mean±SD
Narrative Therapy	Pretest	Test	33.48±5.7
		Control	35.1±7.84
	Posttest	Test	20.1±5.21
		Control	37.4±9.84
Computer-assisted Cognitive Rehabilitation	Pretest	Test	31.72±4.41
		Control	35.1±7.84
	Posttest	Test	20±3.55
		Control	38.95±9.06

Table 2. Comparison of effects of narrative therapy and computer-assisted cognitive rehabilitation on ADHD symptoms

Change Sources	Sum of Squares	Degree of Freedom	Mean Square	F	P-value
Intergroup	1343.699	2	671.849	15.567	0.000
Intragroup	1165.264	27	43.158		
Total	2508.963	29			

Discussion

According to the results of the present study, narrative therapy and computer-assisted cognitive rehabilitation equally decreased ADHD symptoms in children. Moreover, narrative therapy caused a more significant reduction in the symptoms of ADHD children compared to control subjects. This is in congruence with the results of previous studies in this regard (19-22, 36). Evidence suggests that narrative therapy is a highly effective method, which could remarkably enhance the behaviors of children with ADHD.

Emphasis on storytelling and creative narration establishes a safe, entertaining environment for children to become mentally engaged during the process of ADHD treatment. Narrative therapy encompasses the reconstruction of the perception of children through identifying and changing the negative and self-destructive thoughts and beliefs.

In the process of narrative therapy in the current study, participants were considered as individuals capable of understanding and solving their personal problems, as well as finding the most effective solutions and accepting the responsibility of self-management. These individuals are extensively involved with identifying and defining their problems based on experience, perceiving the interconnection of problems, solutions, and the associated consequences. Therefore, they focus on the assessment and recognition of relevant solutions. This approach might be able to compensate for the limited cognitive ability of ADHD children (37).

Developmental psychologists believe that children could become acquainted with the environment, rules and regulations, and social skills through storytelling. In fact, each story could familiarize children with a new concept, so that they would react to real-life events accordingly. Furthermore, stories help children understand how to interact with others, and mental connection of children with the characters of a story could contribute to a better notion of behavioral patterns for children in real life (38).

According to the results of the present study, treatment of ADHD through computer-assisted cognitive rehabilitation more significantly decreased the symptoms of this disorder in children of the test groups compared to the control group. This finding is consistent with the results of previous studies in this regard (23, 27, 28, 30-33). Experimental evidence suggests that treatment of ADHD based on computer-assisted cognitive rehabilitation significantly enhances cognitive functions and self-esteem of these patients (39-40). In explanation, during the treatment of ADHD

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based on computer-assisted cognitive rehabilitation, the patient develops basic cognitive skills through frequent cognitive exercises, which form the foundation of various daily activities.These exercises are represented accurately and rapidly using computers, leading to the improvement of cognitive skills through challenging individual cognitive skills and achieving success during these challenges. This process occurs through the continuous stimulation of less active regions of the brain. The fundamental assumption in this approach is that the learned skills could be transferred and investigated in different conditions via computers. This treatment method increases concentration and attention, improves organizational skills (ability to start and finish a task) and mental flexibility, and increases the motivation of ADHD children (41). In conclusion, given the positive effects of narrative therapy and computer-assisted cognitive rehabilitation on the reduction of ADHD symptoms, both these approaches are recommended for the treatment of ADHD.

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