The University of Tehran Press

The Efficacy of Cognitive-Behavioral Group Therapy on Symptoms of Attention-Deficit/ Hyperactivity Disorder and Executive Functions in Students with ADHD

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Extended Abstract

Aim

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by a persistent pattern of inattention and hyperactivity/impulsivity. This disorder persists into adulthood in 40–60% of individuals (Faraone et al., 2004). One variable strongly associated with ADHD is executive functions (Fan & Wang, 2022). Executive functions are a set of high-level cognitive processes that initiate and regulate goal-oriented behaviors, which require significant mental energy to execute (Cristofori et al., 2019). Since no prior study has examined the effectiveness of cognitive-behavioral therapy (CBT) in reducing ADHD symptoms and improving executive functions among an Iranian sample using accurate diagnostic tools for ADHD in adulthood, this study aimed to evaluate the effectiveness of a cognitive-behavioral intervention in reducing ADHD symptoms and enhancing executive functions in Isfahan university students.

Methodology

This study employed a quasi-experimental design with a pre-test/post-test structure and a one-month follow-up period, including a control group. The study population comprised all university students diagnosed with ADHD in 2021 in Isfahan, Iran. Of these, 20 participants were selected using purposive sampling and randomly divided into two groups: an intervention group (n=10) and a control group (n=10). The experimental group underwent 12 weekly sessions lasting 90 to 120 minutes, conducted online and based on the Cognitive-Behavioral Therapy protocol for Attention Deficit/Hyperactivity Disorder in adults (Safren et al., 2017). No treatment was provided to the control group during the study period. Immediately after the sessions, a post-test was conducted, followed by a follow-up test 30 days later.

The tools used included: the Adult ADHD Self-Report Scale (BAARS-IV) (Barkley, 2011a), the Adult Executive Function Deficits Scale (BDEFS) (Barkley, 2011b), the Autism Spectrum Quotient (ASQ) (Baron-Cohen et al., 2001), the Bipolar Disorder Screening Questionnaire (MDQ) (Hirschfeld et al., 2000), the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway & McKinley, 1943), the Diagnostic Interview for ADHD (DIVA) (Kooij & Francken, 2010), and the Culture-Fair Intelligence Test (CCFIT) (Cattell, 1949).

After ADHD screening among university students, individuals meeting the following criteria were included in the study:

1. Age above 18.
2. Enrollment as a university student in one of the universities in Isfahan.
3. Diagnosis of ADHD based on the DIVA screening interview.

4. Scoring above the cutoff point on the Barkley ADHD screening scale.
5. No use of medication to manage ADHD symptoms for at least two months before therapy.
6. Absence of comorbid bipolar disorder, autism spectrum disorder, or personality disorders.
7. Normal intellectual ability.

Exclusion criteria for the study included having one of the following conditions: bipolar disorder, autism spectrum disorder, intellectual disability, or personality disorders based on the questionnaires, as well as using medications that reduce symptoms of the disorder.

Data were analyzed using SPSS version 24 and repeated measures analysis of variance.

Findings

The average age of the participants was 23.48 ± 1.90 years, with an equal gender distribution (50% female, 50% male). The results of the repeated measures analysis of variance for the time factor were as follows: Pillai's Trace = 11.19, Wilks' Lambda = 17.25, Hotelling's Trace = 25.74, and Roy's Largest Root = 50.19 ($p < 0.05$). For the interaction between time and group, the results were: Pillai's Trace = 10.72, Wilks' Lambda = 18.10, Hotelling's Trace = 29.23, and Roy's Largest Root = 58.14 ($p < 0.05$). Detailed results are presented in Table 1.

Table 1. Results of repeated measures analysis of variance for subscales of variables based on between- and within-subject factors.

Subscale	Effect	Factor	S. S	M.S	F	df	sig	eta	Observed power
Attention Deficit	Within	Time	196.13	131.57	18.41	1.49	<0.001	0.51	1
		Interaction	232.13	155.72	21.79	1.49	<0.001	0.54	0.99
	Between	Group	32.26	32.26	9.73	1	<0.01	0.35	0.83
Impulsivity	Within	Time	12.93	60.46	18.68	2	<0.001	0.50	1
		Interaction	25.20	12.60	3.89	2	<0.05	0.17	0.66
	Between	Group	72.60	72.60	11.70	1	<0.01	0.93	0.89
Hyperactivity	Within	Time	64.30	32.15	10.00	2	<0.001	0.32	0.97
		Interaction	9.30	4.65	1.44	2	>0.05	0.07	0.28
	Between	Group	5.40	5.40	1.64	1	>0.05	0.08	0.22
Sluggish Cognitive Tempo	Within	Time	83.63	41.81	5.41	2	<0.01	0.23	0.81
		Interaction	147.43	73.71	9.53	2	<0.001	0.34	0.97
	Between	Group	281.66	281.66	21.14	1	<0.001	0.54	0.99
Time Management	Within	Time	1236.43	618.21	70.95	2	<0.001	0.79	1
		Interaction	14.73.23	736.61	84.54	2	<0.001	0.82	1
	Between	Group	1804.01	1804.01	180.77	1	<0.001	0.90	1
Behavioral Inhibition	Within	Time	868.80	584.09	40.30	1.48	<0.001	0.69	1
		Interaction	1056.53	710.31	49.01	1.48	<0.001	0.73	1
	Between	Group	2244.81	2244.81	110.55	1	<0.001	0.86	1
Problem Solving	Within	Time	1299.43	649.71	52.07	2	<0.001	0.74	1
		Interaction	1692.70	846.35	67.82	2	<0.001	0.79	1
	Between	Group	3557.40	3557.40	261.36	1	<0.001	0.93	1
Emotional self-Regulation	Within	Time	454.53	227.26	51.82	2	<0.001	0.74	1
		Interaction	596.93	298.46	68.06	2	<0.001	0.79	1
	Between	Group	1126.66	1126.66	101.94	1	<0.001	0.85	1
Self-Motivation	Within	Time	468.03	234.01	47.54	2	<0.001	0.72	1
		Interaction	455.43	227.71	46.26	2	<0.001	0.72	1
	Between	Group	1025.06	1025.06	80.15	1	<0.001	0.81	1

Based on the results in Table 1, the effect of time was significant across all subscales.

Conclusion

The present study aimed to evaluate the effectiveness of cognitive-behavioral therapy (CBT) on attention deficit hyperactivity disorder (ADHD) symptoms and executive functions in university students with ADHD in Isfahan. Results showed that CBT significantly improved symptoms and executive functions in the experimental group compared to the control group. These findings align with previous studies on CBT for adults with ADHD (Solanto et al., 2018). However, the effectiveness

on attention deficits diminished during the one-month follow-up, suggesting that longer intervention durations may be needed for sustained improvement in attention. CBT was effective in reducing impulsivity and improving self-regulation, with these changes continuing into follow-up. Nonetheless, the intervention did not significantly impact hyperactivity symptoms, possibly due to the need for more active control strategies. Cognitive restructuring during CBT also helped improve time management, problem-solving, and emotional regulation. Limitations of the study included the lack of differentiation based on ADHD subtypes and gender. The findings suggest that CBT is a promising treatment for ADHD in university students, but further studies should include booster sessions and explore combining CBT with medication.

Keywords: Attention-Deficit/Hyperactivity Disorder, Cognitive Behavior Therapy, Executive Functions Deficiency, Students.

Ethical Considerations

This study is derived from the doctoral dissertation of the first author and was conducted under the supervision of the Research Ethics Committee at the University of Isfahan with the ethics code IR.UI.REC.1399.100. The rights of participants were fully observed, including the right to withdraw from the study at their discretion, the confidentiality of personal information, minimizing potential risks, obtaining permission for the publication of research results, and adherence to ethical principles in manuscript writing.

Acknowledgments and Financial Support

We sincerely thank all participants. This study was conducted without external financial support.

Conflict of Interest

The authors declare no conflicts of interest.

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Cite this article: Moradi Siah Afshadi, M., Amiri, Sh., & Talebi, M. (2024). The Efficacy of Cognitive-Behavioral Group Therapy on Symptoms of Attention-Deficit/ Hyperactivity Disorder and Executive Functions in Students with ADHD. *Journal of Applied Psychological Research*, *15*(4), 261-282. doi: 10.22059/japr.2024.350537.644430.

Publisher: University of Tehran Press © The Author(s).
DOI: https://doi.org/10.22059/japr.2024.350537.644430