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The Effectiveness of Acceptance and Commitment Therapy on Emotion Regulation, Behavioral Symptoms, and Academic Performance of Children with Attention Deficit/Hyperactivity Disorder

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Abstract

Background: Children with attention-deficit/hyperactivity disorder (ADHD) frequently struggle with emotional regulation, behavioral issues, and academic performance, leading to peer rejection and social isolation.

Objectives: The present study aimed to investigate the effects of acceptance and commitment therapy (ACT) on emotion regulation, behavioral symptoms, and academic performance of children with ADHD.

Methods: A quasi-experimental study was conducted using a pretest-posttest design. The study population consisted of all primary school students with ADHD aged 7 - 11, as well as their mothers, in Amol in 2021. A purposive sample of 30 individuals was selected for the study. Participants were assigned to either the ACT training group (n = 15) or the control group (n = 15) through a simple random allocation. The participants in the study filled out questionnaires on emotion regulation, children's behavioral symptoms, and academic performance. The data was analyzed using an analysis of covariance.

Results: In the pretest phase, the scores for adaptive emotion regulation strategies, maladaptive emotion regulation strategies, behavioral symptoms, and academic performance were 43.07 ± 6.05, 65.13 ± 9.27, 91.20 ± 12.58, and 128.47 ± 29.84, respectively; whereas in the posttest phase, they were 61.20 ± 8.01, 52.00 ± 6.00, 67.13 ± 12.73, and 159.73 ± 21.11, respectively. Acceptance and commitment therapy resulted in enhanced emotion regulation strategies and academic performance, as well as a decrease in behavioral symptoms in children with ADHD ($P < 0.001$).

Conclusions: Given the effectiveness of acceptance and commitment therapy training in emotion regulation, behavioral symptoms, and academic performance, this approach may be employed by counselors and psychologists at counseling and psychotherapy centers to help remedy ADHD.

Keywords: Acceptance and Commitment Therapy, Emotions, Behavioral Symptoms, Academic Performance, ADHD

1. Background

Attention deficit/hyperactivity disorder (ADHD) is recognized as a highly prevalent diagnostic condition within the domain of neurodevelopmental disorders. This disorder is characterized by inattention, hyperactivity, impulsivity, and certain cognitive deficits (1). These symptoms can have a significant impact on various aspects of one's life, including functioning, emotions, and cognitive abilities (2). Attention deficit/hyperactivity disorder is a condition that usually starts in childhood and impacts both development and brain function (3). It affects around 4 - 12% of the population, with boys being three times more likely to have it than girls (4). New research suggests that symptoms may continue into adulthood or emerge later in life (5). However, the difficulties faced during teenage years and adulthood can vary and be more severe. Adulthood is a time filled with numerous responsibilities and the need to navigate through real occupational and social situations, with all the responsibility falling only on the person. Thus, the inability to manage symptoms can be considerably more bothersome than in childhood (6).

As a common condition in people with ADHD, emotional regulation disorder is one of the most serious disorders that causes more problems in adulthood than in childhood (7). Emotion regulation refers to the

various processes that individuals use to have control over their emotions, including when they experience them and how they present them (8). Emotion regulation involves a range of skills that help individuals monitor, evaluate, and adjust their emotional responses to align with their objectives (9). When confronted with an emotional situation, people require optimal cognitive functions to regulate and control their emotions (10). Emotion regulation involves adaptive strategies such as refocusing on planning, acceptance, putting into perspective, positive refocusing, and positive reappraisal, as well as maladaptive strategies like self-blame, blaming others, rumination, and dramatization (11). Difficulty in emotion regulation, on the other hand, is defined as a transdiagnostic factor manifesting as non-acceptance of emotional responses or anxiety, difficulty participating in targeted behaviors and strategies, lack of emotional awareness, difficulty controlling impulses, lack of emotional clarity, and limited access to emotion regulation strategies (12).

Academic performance holds significant importance for educational managers. Having control over the learning process is becoming increasingly important for learners (13). Today, academic performance is widely recognized as a highly important metric in the education system. Ensuring the growth and improvement of individuals in educational environments has always been a top priority (14). Put simply, the focus on enhancing academic performance has resulted in the development of solutions to address this issue (15). Nevertheless, the endeavor to enhance academic performance based on these strategies has not consistently yielded positive results, particularly among certain groups (16). The academic performance of students with ADHD is influenced by a variety of factors, including educational, psychological, and sociological factors. Identifying and manipulating each of these variables can lead to an improvement in their academic performance (17).

Behavioral problems are among the issues that may also present in children with ADHD (18). Symptoms of ADHD disorder have also been reported in certain children with disruptive behavior problems, according to Kivumbi et al. (19). Children diagnosed with ADHD often exhibit challenging behaviors, such as conduct issues (20). These behavioral problems can be particularly challenging for families with lower levels of resilience (4). These children may struggle with emotional-behavioral problems, such as anxiety, depression, low self-confidence, aggression, and antisocial behaviors (21). They may also have difficulty understanding and responding to the emotions, behaviors, and intentions of others, which can impact their social interactions and communication with peers (22). Regarding the etiology of ADHD behavioral problems, numerous factors have been suggested, such as the potential connection between behavioral problems and sleep, sensory issues, and parental psychological problems (23).

Various therapeutic and educational approaches have been used to improve the symptoms of psychological harm in individuals with ADHD. A widely used treatment method ACT (24). One of the strengths of ACT is its distinct and well-founded philosophical and theoretical foundation, which differentiates it from other approaches (25). The main focus is on clarifying values and goals, with an emphasis on embracing all emotions and situations (26). The acceptance and commitment approach does not seek to alleviate disease symptoms. Rather, it intends to assist people in defining their personal values and meanings and to accept pain and problems as an integral part of life (27). Individuals would increase their psychological adaptability and lead a more meaningful and vibrant life by acting upon their pains and problems (28). In recent years, ACT has been used to treat depression and improve mental health and cognitive function (29).

Hyperactivity affects various areas of children's lives, such as emotional regulation, behavioral issues, and academic achievement, all of which can impact their academic success and social interactions. Given the promising outcomes seen with ACT in the past, it is crucial to examine how this approach can help improve emotion regulation, behavior, and academic performance in children with ADHD.

2. Objectives

This study sought to assess the impact of ACT on emotion regulation, behavioral symptoms, and academic performance in children with ADHD.

3. Methods

A quasi-experimental study was conducted using a pretest-posttest design. The study population comprised all primary school children aged 7 - 11 with ADHD, along with their mothers, who were referred to psychology centers in Amol, (Iran) in 2021. A purposive sample of 30 children, together with their mothers, was selected for the study. The sample size needed was calculated based on a test power of 0.80, an effect size of 0.96, and a confidence level of 0.95, which led to 15 children in each group (30). Participants were assigned to either the ACT

training group (n = 15) or the control group (n = 15) through a random allocation process. In this study, we used a random number table to randomly assign students to intervention and control groups. The inclusion criteria included the diagnosis of ADHD by a psychologist according to DSM-5 criteria, mothers' consent for participating in the research, and middle school education or higher for the mothers to understand the questionnaire items. The exclusion criteria included autism spectrum disorder or intellectual disability in ADHD children, chronic mental health conditions, and missing more than two intervention program sessions.

3.1. Instruments

3.1.1. Cognitive Emotion Regulation Questionnaire (CERQ)

This questionnaire was developed by Garnefski and Kraaij (31). This questionnaire is a multidimensional self-report tool with 36 items. Cognitive emotion regulation questionnaire evaluates nine factors: Five for adaptive emotion regulation strategies (positive refocusing, acceptance, positive reappraisal, refocusing on planning, and putting into perspective) and four for maladaptive emotion regulation strategies (self-blame, catastrophizing, rumination, and blaming others). Abdi et al. (32) reported the reliability for this scale equal to 0.82.

3.1.2. Conner's Adult ADHD Rating Scale – Self-report Form and Subscale (CAARSS:S)

The parental form of Connor's scale has 48 items that the child's parents must complete. Parents rate the items on a four-point Likert scale, with the scores for each question ranging from 0 (not true at all, or never, rarely) to 3 (completely true, or most of the time, almost always) (33). The range of CAARSS : S scores is between 0 and 144, with a higher score indicating a behavioral disorder in the child. Moghadasin and Dibajnia (34) reported the reliability of this scale equal to 0.87 based on Cronbach's alpha coefficient

3.1.3. Educational Performance Test (EPT)

This questionnaire has been adapted from Pham and Taylor's (35) research on academic achievement. The questionnaire consists of 48 items that aim to assess academic performance across various areas, including self-efficacy, emotional effects, planning, lack of outcome control, and motivation. Saffarieh et al. (36) reported the total Cronbach's alpha coefficients of the EPT to be 0.90.

3.2. Acceptance and Commitment Therapy

Based on Hayes et al.'s (37) method of acceptance and commitment, the content was delivered in eight 90-minute sessions, as described in Table 1. The ACT sessions were conducted by the first author. During the execution of the ACT sessions in the experimental group, the control group did not receive any intervention and was placed on the waiting list.

3.3. Data Analysis

The data were analyzed using descriptive statistics (mean and standard deviation) and analysis of covariance in the SPSS-24 software. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to check the normal distribution of the data. A paired *t*-test was used to compare the means in the ACT and control groups. The level of significance was set to $\alpha = 0.05$.

4. Results

The mean (± SD) age of children with ADHD in the intervention and control groups were 8.67 ± 2.40 and 9.37 ± 2.72 years, respectively. In the intervention group, there were 7 boys and 8 girls, while in the control group, there were 6 boys and 9 girls. Table 2 displays descriptive indices of research variables for each group in the pretest and posttest. According to the findings, the mean values of the experimental and control groups were nearly identical for all three variables during the pretest stage. During the posttest phase, the experimental group exhibited an increase in the mean values of academic performance and adaptive strategies of emotion, while a decline was observed in the mean values of maladaptive strategies of emotion and behavioral symptoms ($P < 0.001$). In the control group, however, no differences were noted between the pretest and posttest phases.

The values of both the Kolmogorov-Smirnov and Shapiro-Wilk tests for the dependent variables in the pretest and posttest stages were not statistically significant at the 0.05 level. This suggests that the data was distributed normally in both stages. In addition, the results indicate that the error variances of the dependent variables are not statistically significant. As such, the assumption of equal variances for the dependent variables was valid.

Results of the analysis of covariance revealed a significant difference between the group means for

Table 1. Description of Acceptance and Commitment Therapy Sessions

Sessions	Content
1	Building effective communication and fostering a positive rapport with participants; finalizing the treatment agreement of the therapeutic partnership with the participants; providing clear information about the rules, objectives, and number of treatment sessions; performing the pretest
2	Calling and exploring; encouraging to reread people's experiences consciously; and motivating participants to give up on failed strategies
3	Identifying and resolving conflict-provoking and disturbing issues; listening to and uncovering the subject's accounts of preexisting problems; gathering data on the historical development of the primary attachment pattern and its present association with control dynamics
4	Developing an understanding of the underlying emotions; identifying negative interactive cycles and tendency situations; identifying painful aspects of participants' experiences; observing the processing style of emotional issues; recognizing interpersonal and intrapersonal issues; the metaphor of walking with the mind; the metaphor of the bus; reviewing the process of defusing
5	Reviewing previous assignments; reducing reliance on the conceptualized self; differentiating between the conceptualized self and the observer self; developing awareness of the observer self
6	Facilitating the interaction of wants and needs for restructuring; interacting to create new perceptions; developing new necessary solutions
7	Defining the notions of values, goals, and aspirations
8	Summary and conclusion in collaboration with participants; posttest administration

Table 2. Mean and Standard Deviation of the Research Variables in ACT and Control Groups [a]

Variables and Phases	ACT Group	Control Group	P-Value
Adaptive emotion regulation strategies			
Pretest	43.07 ± 6.05	42.80 ± 10.12	0.930
Posttest	61.20 ± 8.01	42.33 ± 10.69	0.001
Maladaptive emotion regulation strategies			
Pretest	65.13 ± 9.27	65.60 ± 8.73	0.887
Posttest	52.00 ± 6.00	63.27 ± 9.72	0.001
Behavioral symptoms			
Pretest	91.20 ± 12.58	91.13 ± 8.62	0.986
Posttest	67.13 ± 12.73	87.60 ± 9.89	0.001
Academic performance			
Pretest	128.47 ± 29.84	129.67 ± 20.65	0.898
Posttest	159.73 ± 21.11	135.93 ± 10.42	0.001

[a] Values are expressed as mean ± SD.

maladaptive and adaptive emotion regulation. According to the findings, there was a significant difference between the ACT and control groups regarding their adaptive (F = 28.59, P = 0.001) and maladaptive (F = 9.81, P = 0.001) strategies. According to the findings, there was a significant difference in behavioral symptoms between the ACT and control groups (F = 18.73, P = 0.001). This finding demonstrated that ACT reduced behavioral symptoms in ADHD children. The between-group effects test revealed a significant difference in the mean academic performance scores of the groups (F = 19.52, P = 0.001). It is evident from this finding that the ACT positively enhanced the academic performance of children with ADHD in the posttest phase (Table 3).

5. Discussion

This research aimed to investigate the effectiveness of ACT on emotion regulation, behavioral symptoms, and academic performance of children with ADHD. The results demonstrated the ACT's effectiveness in enhancing emotion regulation strategies, boosting academic performance, and mitigating behavioral symptoms in children with ADHD. This finding is consistent with those of Munawar et al. (24). Sánchez et al. (10) revealed that hyperactive children struggle with the cognitive processing of emotional information and regulating their emotions. This disability disrupts the emotional and cognitive organization of ADHD children (10). Children with ADHD often experience psychological distress and may struggle to effectively regulate their emotions in different situations. On the other hand, they have a lot of negative emotions, which leads to other issues such as a negative perception of

Table 3. Results of the Analysis of Covariance on Research Variables in Experimental and Control Groups

Variables	SS	df	MS	F	P-Value	η^2
Adaptive emotion regulation strategies	3794.40	1	3794.40	28.59	0.001	0.60
Maladaptive emotion regulation strategies	997.21	1	997.21	9.81	0.001	0.34
Behavioral symptoms	5190.94	1	5190.94	18.73	0.001	0.50
Academic performance	8288.71	1	8288.71	19.52	0.001	0.51

themselves, worries about relationships with others, and inappropriate social performance (12).

When discussing the impact of ACT-based parenting training on ADHD children's emotion regulation, behavioral symptoms, and academic performance, it is worth noting that ACT interventions incorporate cognitive defusing, acceptance of unpleasant thoughts and feelings, and mindfulness skills (24). These parameters improved parents' psychological flexibility and their ability to respond more adaptively to their child's misbehavior. Children with ADHD learn to disregard their unpleasant thoughts and respond accordingly. Additionally, promoting value-based communication and reinforcing committed behavior in line with life values—particularly those of the family and the parent—motivated children to exhibit better responses in their behavior (25). Therefore, it can be concluded that the adaptive responses of children with ADHD may have helped them break free from the vicious circle of communication and encourage more positive behavior in the child.

Acceptance and commitment therapy helps students develop a heightened sense of mindfulness, allowing them to fully engage with situations without passing judgment. By using the ACT approach, one can tap into its underlying mechanisms, including acceptance, desensitization, presence at the moment, and non-judgmental observation (28). This can lead to enhanced effectiveness, a decrease in psychological symptoms, and improved emotion regulation. Through ACT training, students with ADHD can develop the skills to respond adaptively to life and academic challenges in the face of negative thoughts and emotions that can hinder their psychological inflexibility in dealing with the problems associated with their disorder.

In addition to decreasing inefficient control behaviors, ACT seeks to improve the psychological acceptance of mental experiences (thoughts, feelings) in children with ADHD. Clients are informed that attempting to avoid or control these unwanted mental experiences is counterproductive and can actually make them more intense. They are encouraged to accept these experiences without reacting internally or externally to their elimination. In the second step, there is an increased focus on the person's psychological awareness in the present moment. This involves being mindful of one's mental state, thoughts, and behavior in the present moment. In the third stage, individuals are guided to detach themselves from these mental experiences (cognitive defusion) in a manner that enables them to act independently of these experiences. In the fourth step, there is a focus on reducing excessive concentration on one's self-created personal narrative, such as a tendency toward victimization. In the fifth step, the individual is assisted in understanding their personal values and defining them clearly (27). This helps them transform their values into specific behavioral goals, which in turn creates motivation for taking committed action toward these goals and values. It also involves accepting mental experiences along the way.

From the acceptance and commitment perspective, it is believed that negative thoughts and feelings in children can lead to behaviors that are not appropriate or effective. Furthermore, the methods employed to suppress and manage unfavorable thoughts amplify these thoughts and hinder children from using value-based parenting skills (29). ACT-based interventions offer an alternative to addressing negative thoughts and emotions compared to conventional methods. Instead of attempting to control or suppress negative thoughts, these interventions aim to promote open communication and acceptance of negative thoughts and feelings that may arise during parent-child interaction.

Some of the limitations of this research include having a limited number of samples, a lack of control over the socio-economic status of the sample group, and not controlling for certain interfering variables such as the severity of the disorder. It is also worth mentioning that since the selected sample was from the city of Amol, caution should be exercised in generalizing the results to other communities.

5.1. Conclusions

The implementation of ACT resulted in enhanced emotion regulation strategies and academic performance while also decreasing behavioral symptoms in children with ADHD. ACT training helps children with ADHD learn how to express their emotions more appropriately for various situations. They can improve their negative self-image and regard themselves as useful individuals by accepting their emotions, expressing them on time, and controlling the negative side of those emotions. In light of the research findings and to enhance academic achievement, behavioral symptoms, and emotional regulation among children with ADHD, it is recommended that school administrators identify mental and emotional challenges faced by this population and refer affected students to counseling centers for ACT intervention.

Footnotes

Authors' Contribution: S.K.H. and R.J.F.: Study concept and design, acquisition of data, analysis and interpretation of data, and statistical analysis. R.J.F. and M.T.S.: Administrative, technical, and material support, study supervision. S.K.H. and R.J.F.: Critical revision of the manuscript for important intellectual content.

Conflict of Interests: The authors declare that they have no competing interests.

Data Availability: The datasets generated and/or analyzed during the current study are not publicly available due to privacy/ethical restrictions but are available from the corresponding author upon reasonable request.

Ethical Approval: The study was approved by the Ethical Committee of Islamic Azad University- Ahvaz Branch (code: IR.IAU.AHVAZ.REC.1400.061).

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References

1. Magnus W, Nazir S, Anilkumar AC, Shaban K. Attention Deficit Hyperactivity Disorder. *StatPearls*. 2023. [PubMed ID: 28722868].
2. Molazamani F, Bavi S, Jayervand H. Effects of a Computer-Based Intervention on Sustained Attention, Divided Attention, and Impulsivity in Children with Attention Deficit Hyperactivity Disorder. *J Clin Res Paramed Sci*. 2023;**12**(2). https://doi.org/10.5812/jcrps-140046.
3. Antshel KM, Barkley R. Attention deficit hyperactivity disorder. *Handb Clin Neurol*. 2020;**174**:37-45. [PubMed ID: 32977893]. https://doi.org/10.1016/B978-0-444-64148-9.00003-X.
4. Wilens TE, Spencer TJ. Understanding attention-deficit/hyperactivity disorder from childhood to adulthood. *Postgrad Med*. 2010;**122**(5):97-109. [PubMed ID: 20861593]. [PubMed Central ID: PMC3724232]. https://doi.org/10.3810/pgm.2010.09.2206.
5. Sibley MH, Swanson JM, Arnold LE, Hechtman LT, Owens EB, Stehli A, et al. Defining ADHD symptom persistence in adulthood: optimizing sensitivity and specificity. *J Child Psychol Psychiatry*. 2017;**58**(6):655-62. [PubMed ID: 27642116]. [PubMed Central ID: PMC5809153]. https://doi.org/10.1111/jcpp.12620.
6. Di Lorenzo R, Balducci J, Poppi C, Arcolin E, Cutino A, Ferri P, et al. Children and adolescents with ADHD followed up to adulthood: a systematic review of long-term outcomes. *Acta Neuropsychiatr*. 2021;**33**(6):283-98. [PubMed ID: 34384511]. https://doi.org/10.1017/neu.2021.23.
7. Soler-Gutierrez AM, Perez-Gonzalez JC, Mayas J. Evidence of emotion dysregulation as a core symptom of adult ADHD: A systematic review. *PLoS One*. 2023;**18**(1). e0280131. [PubMed ID: 36608036]. [PubMed Central ID: PMC9821724]. https://doi.org/10.1371/journal.pone.0280131.
8. Rastgoo F, Bahri MRZ, Rahmani MA. The Mediating Role of Emotion Regulation in the Relationship Between Defense Styles and Psychological Vulnerability Among Emergency Medicine Physicians. *J Clin Res Paramed Sci*. 2023;**12**(1).
9. Menefee DS, Ledoux T, Johnston CA. The Importance of Emotional Regulation in Mental Health. *Am J Lifestyle Med*. 2022;**16**(1):28-31. [PubMed ID: 35185423]. [PubMed Central ID: PMC8848120]. https://doi.org/10.1177/15598276211049771.
10. Sanchez M, Lavigne R, Romero JF, Elosegui E. Emotion Regulation in Participants Diagnosed With Attention Deficit Hyperactivity Disorder, Before and After an Emotion Regulation Intervention. *Front Psychol*. 2019;**10**:1092. [PubMed ID: 31178779]. [PubMed Central ID: PMC6543912]. https://doi.org/10.3389/fpsyg.2019.01092.
11. Sohrabi M, Bakhtiarpour S, Sohrabi F, Eftekhar Saadi Z, Asgari P. Effectiveness of Contextual Schema Therapy for Extreme Perfectionism and Emotion Regulation in Individuals with Perfectionism Disorder. *J Clin Res Paramed Sci*. 2023;**12**(2). https://doi.org/10.5812/jcrps-140511.
12. Beheshti A, Chavanon ML, Christiansen H. Emotion dysregulation in adults with attention deficit hyperactivity disorder: a meta-analysis. *BMC Psychiatry*. 2020;**20**(1):120. [PubMed ID: 32164655]. [PubMed Central ID: PMC7069054]. https://doi.org/10.1186/s12888-020-2442-7.
13. Henning C, Summerfeldt LJ, Parker JDA. ADHD and Academic Success in University Students: The Important Role of Impaired Attention. *J Atten Disord*. 2022;**26**(6):893-901. [PubMed ID: 34384265]. [PubMed Central ID: PMC8859654]. https://doi.org/10.1177/10870547211036758.
14. Jangmo A, Stalhandske A, Chang Z, Chen Q, Almqvist C, Feldman I, et al. Attention-Deficit/Hyperactivity Disorder, School Performance, and Effect of Medication. *J Am Acad Child Adolesc Psychiatry*. 2019;**58**(4):423-32. [PubMed ID: 30768391]. [PubMed Central ID: PMC6541488]. https://doi.org/10.1016/j.jaac.2018.11.014.
15. Arnold LE, Hodgkins P, Kahle J, Madhoo M, Kewley G. Long-Term Outcomes of ADHD: Academic Achievement and Performance. *J Atten Disord*. 2020;**24**(1):73-85. [PubMed ID: 25583985]. https://doi.org/10.1177/1087054714566076.
16. Reuter PR, Forster BL. Student health behavior and academic performance. *PeerJ*. 2021;**9**. e11107. [PubMed ID: 33959411]. [PubMed Central ID: PMC8054760]. https://doi.org/10.7717/peerj.11107.
17. Kamal M, Al-Shibli S, Shahbal S, Yadav SK. Impact of attention deficit hyperactivity disorder and gender differences on academic and social difficulties among adolescents in Qatari Schools. *Qatar Med J*. 2021;(1):11. [PubMed ID: 33777722]. [PubMed Central ID: PMC7961152]. https://doi.org/10.5339/qmj.2021.11.

18. Leader G, Moore R, Chen JL, Caher A, Arndt S, Maher L, et al. Attention deficit hyperactivity disorder (ADHD) symptoms, comorbid psychopathology, behaviour problems and gastrointestinal symptoms in children and adolescents with autism spectrum disorder. *Ir J Psychol Med*. 2022;**39**(3):240-50. [PubMed ID: 33973506]. https://doi.org/10.1017/ipm.2020.135.
19. Kivumbi A, Byansi W, Damulira C, Namatovu P, Mugisha J, Sensoy Bahar O, et al. Prevalence of behavioral disorders and attention deficit/hyperactive disorder among school going children in Southwestern Uganda. *BMC Psychiatry*. 2019;**19**(1):105. [PubMed ID: 30943981]. [PubMed Central ID: PMC6446353]. https://doi.org/10.1186/s12888-019-2069-8.
20. Cabral MDI, Liu S, Soares N. Attention-deficit/hyperactivity disorder: diagnostic criteria, epidemiology, risk factors and evaluation in youth. *Transl Pediatr*. 2020;**9**(Suppl 1):S104-13. [PubMed ID: 32206588]. [PubMed Central ID: PMC7082246]. https://doi.org/10.21037/tp.2019.09.08.
21. Yoo HJ, Han JM, Kim K, Song G, Yee J, Chung JE, et al. Association between attention deficit hyperactivity disorder and aggression subscales in adolescents. *Brain Behav*. 2021;**11**(3). e02030. [PubMed ID: 33439553]. [PubMed Central ID: PMC7994686]. https://doi.org/10.1002/brb3.2030.
22. Rizzutti S, Schuch V, Augusto BM, Coimbra CC, Pereira JP, Bueno OF. Neuropsychological Profiles Correlated with Clinical and Behavioral Impairments in a Sample of Brazilian Children with Attention-Deficit Hyperactivity Disorder. *Front Psychiatry*. 2015;**6**:163. [PubMed ID: 26635638]. [PubMed Central ID: PMC4661035]. https://doi.org/10.3389/fpsyt.2015.00163.
23. Ghanizadeh A. Sensory processing problems in children with ADHD, a systematic review. *Psychiatry Investig*. 2011;**8**(2):89-94. [PubMed ID: 21852983]. [PubMed Central ID: PMC3149116]. https://doi.org/10.4306/pi.2011.8.2.89.
24. Munawar K, Choudhry FR, Lee SH, Siau CS, Kadri NBM, Binti Sulong RM. Acceptance and commitment therapy for individuals having attention deficit hyperactivity disorder (ADHD): A scoping review. *Heliyon*. 2021;**7**(8). e07842. [PubMed ID: 34466706]. [PubMed Central ID: PMC8385395]. https://doi.org/10.1016/j.heliyon.2021.e07842.
25. Liu H, Liu N, Chong ST, Boon Yau EK, Ahmad Badayai AR. Effects of acceptance and commitment therapy on cognitive function: A systematic review. *Heliyon*. 2023;**9**(3). e14057. [PubMed ID: 36938399]. [PubMed Central ID: PMC10015206]. https://doi.org/10.1016/j.heliyon.2023.e14057.
26. Mami S, Tahmasebian H, Jahangiri MM. The Effectiveness of Acceptance and Commitment Therapy (ACT) on Reducing the Severity of Perceived Pain in Women with Breast Cancer. *J Clin Res Paramed Sci*. 2019;**8**(1).
27. Li Z, Shang W, Wang C, Yang K, Guo J. Characteristics and trends in acceptance and commitment therapy research: A bibliometric analysis. *Front Psychol*. 2022;**13**:980848. [PubMed ID: 36452380]. [PubMed Central ID: PMC9702511]. https://doi.org/10.3389/fpsyg.2022.980848.
28. Dindo L, Van Liew JR, Arch JJ. Acceptance and Commitment Therapy: A Transdiagnostic Behavioral Intervention for Mental Health and Medical Conditions. *Neurother*. 2017;**14**(3):546-53. [PubMed ID: 28271287]. [PubMed Central ID: PMC5509623]. https://doi.org/10.1007/s13311-017-0521-3.
29. Beygi Z, Tighband Jangali R, Derakhshan N, Alidadi M, Javanbakhsh F, Mahboobizadeh M. An Overview of Reviews on the Effects of Acceptance and Commitment Therapy (ACT) on Depression and Anxiety. *Iran J Psychiatry*. 2023;**18**(2):248-57. [PubMed ID: 37383966]. [PubMed Central ID: PMC10293686]. https://doi.org/10.18502/ijps.v18i2.12373.
30. Azhdari Z, Alizadeh M, Homaei R. Effects of parent-child Interaction therapy on behavioral problems of children with attention deficit/hyperactivity disorder in Iran. *Int J Pediatr*. 2022;**10**(8):16477-85.
31. Garnefski N, Kraaij V, Spinhoven P. Negative life events, cognitive emotion regulation and emotional problems. *Pers Individ Dif*. 2001;**30**(8):1311-27. https://doi.org/10.1016/s0191-8869(00)00113-6.
32. Abdi S, Taban S, Ghaemian A. Cognitive emotion regulation questionnaire: Validity and reliability of Persian translation of CERQ-36 item. *Procedia Soc Behav Sci*. 2012;**32**:2-7. https://doi.org/10.1016/j.sbspro.2012.01.001.
33. Conners C, Erhardt D, Sparrow EP. Conners' adult ADHD rating scales (CAARS). *Multi-Health Systems Inc (MHS)*. 1999:composantes diverses.
34. Moghadasin M, Dibajnia P. [Validation of the Persian version of the Connerâ s Adult ADHD Rating Scalesâ self-report (CAARS-S-SV)]. *Clin Psychol Pers*. 2020;**18**(1):177-99. Persian.
35. Pham LB, Taylor SE. From Thought to Action: Effects of Process-Versus Outcome-Based Mental Simulations on Performance. *Pers Soc Psychol Bull*. 2016;**25**(2):250-60. https://doi.org/10.1177/0146167299025002010.
36. Saffarieh M, Rezaei AM, Mohammadifar MA. [Evaluation of validity and reliability of Pham and Taylor Academic Performance Questionnaire (1999)]. *Jundishapur Educ Dev J*. 2022. Persian.
37. Hayes SC, Levin ME, Plumb-Vilardaga J, Villatte JL, Pistorello J. Acceptance and Commitment Therapy and Contextual Behavioral Science: Examining the Progress of a Distinctive Model of Behavioral and Cognitive Therapy. *Behavior Therapy*. 2013;**44**(2):180-98. https://doi.org/10.1016/j.beth.2009.08.002.