

The Effects of Mindfulness-Based Art Therapy on Reducing Aggression and Enhancing Empathy among Children with ADHD

Kian Nasernejad ¹, Reza Johari Fard ^{1*}, Parvin Ehteshamzadeh ¹, Saeed Bakhtiarpour ¹,
Mohammad Hossein Mohebbi Nouredinvand ²

1. Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran.

2. Department of Psychology, Masjed Soleiman Branch, Islamic Azad University, Masjed Soleiman, Iran.

*Corresponding Author: Dr. Reza Johari Fard;

Address: Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, 61349-37333, Iran.

Tel: +98 6133348420

Fax: +98 6133329200

E-mail: rjoharfard@gmail.com

Article Info.

Article type:

Research Article

Received: 16 Aug. 2024

Revised: 29 Nov. 2024

Accepted: 2 Dec. 2024

Published: 15 Feb. 2025

Keywords:

ADHD,
Aggression,
Art Therapy,
Child,
Empathy

ABSTRACT

Background and Objective: Children with attention deficit hyperactivity disorder (ADHD) often exhibit elevated levels of aggression and deficits in empathy, negatively impacting their social and academic lives. The present study aimed to investigate the effects of mindfulness-based art therapy on aggression and empathy among children with ADHD.

Methods: A study was conducted with 44 ADHD-diagnosed children in Amol City, Northern Iran, during the 2023 academic year, using a pre-test, post-test, and control group design. Participants were randomly divided into an experimental group (n=22) and a control group (n=22). The experimental group received ten 60-minute mindfulness-based art therapy sessions. Data were collected using the Child Behavior Aggression Scale and The Children's Empathy Quotient, with analysis performed using analysis of covariance.

Findings: Aggression scores significantly decreased in the experimental group (58.91 ± 2.97 at pre-test; 39.82 ± 2.70 at post-test) compared to minimal changes in the control group (60.17 ± 3.12 at pre-test; 58.27 ± 3.79 at post-test). Conversely, empathy scores significantly increased in the experimental group (18.41 ± 4.95 on the pre-test; 27.50 ± 5.45 on the post-test). These findings indicate that mindfulness-based art therapy produced significant reductions in aggression and enhancements in empathy among children with ADHD ($P < 0.001$).

Conclusion: Mindfulness-based art therapy has proven effective in reducing aggression and enhancing empathy in children with ADHD. This method promotes emotional regulation, self-awareness, and social skills, making it particularly beneficial for those unresponsive to traditional therapies. By integrating mindfulness techniques, psychotherapists can assist children in managing emotions, curbing impulsive behavior, and improving social interactions, offering a promising therapeutic approach for this population.

Cite this Article:

Nasernejad K, Johari Fard R, Ehteshamzadeh P. The Effects of Mindfulness-Based Art Therapy on Reducing Aggression and Enhancing Empathy among Children with ADHD .Caspian J Pediatr March 2024; 10: e15.



Introduction

Childhood is a critical period where neglect can lead to lasting consequences [1]. Diagnosing issues in children is complex due to their ongoing development and limited psychosocial skills [2]. Early childhood provides an opportunity to identify and intervene in difficulties, preventing future social, emotional, and academic challenges [3]. Timely interventions can improve children's social standing, skills, and academic readiness [4]. Researching childhood behavioral disorders, such as attention deficit/hyperactivity disorder (ADHD)—affecting 2.7% of children globally—is essential in exceptional children's psychology [5]. ADHD is marked by impulsivity, hyperactivity, and inattention, requiring symptoms to be present in at least two settings before age seven, significantly impairing functioning in areas like academics and social interactions [6, 7].

Children with ADHD often struggle with emotional regulation, significantly impacting their social interactions both at home and in school. They commonly face challenges such as social difficulties, aggression, and rule-breaking [8]. Emotional and behavioral disorders in these children typically manifest as externalizing disorders, like defiance and aggression, or internalizing disorders, such as anxiety and depression [9]. These conditions lead to deficits in social functioning, affecting their ability to wait their turn, respond to nonverbal cues, and engage appropriately in social settings, making it tough to form and maintain friendships [10]. Additionally, emotional and behavioral issues can impede a child's adaptive abilities [11]. Conversely, empathy plays a vital role in enhancing the quality of child-caregiver relationships and serves as a protective factor against various emotional and behavioral problems [12]. Defined as the capacity to understand and share the feelings of others, empathy helps children navigate social interactions and connect with others [13, 14]. However, studies indicate that children with ADHD may struggle to identify emotions, grasp emotional causation, and interpret others' intentions effectively [15, 16].

Current evidence-based interventions for children with ADHD encompass behavioral therapy, pharmacotherapy, and a combination of both [17, 18]. However, a range of other interventions are

frequently employed alongside or as substitutes for these evidence-based treatments. One notable example is the utilization of mindfulness-based interventions, which have demonstrated efficacy in enhancing attention, mitigating disruptive behaviors, and fostering self-regulatory abilities within general education settings for children [19]. Mindfulness-based art therapy is an effective approach for managing ADHD, utilizing techniques that establish a “mind-body connection.” This therapy combines mindfulness practices with art therapy, benefiting children with ADHD by enhancing self-awareness, attention, and creativity while reducing stress and anxiety [20]. By focusing on the present and their internal experiences, children learn to regulate their emotions and behaviors, improving concentration and reducing impulsiveness. Furthermore, art therapy serves as a calming activity that helps manage stress and provides a non-verbal outlet for self-expression, making it particularly beneficial for those who struggle with verbal communication and enhancing overall treatment outcomes [21].

Researchers have also found that art therapy has the potential to reduce symptoms of emotional problems, negative cognitions, and attitudes in children and adolescents. This therapy is effective in reducing attention and aggression in children [22], improving emotion regulation, empathy, and executive functioning in anxious children [23], decreasing aggressive behavior in female students with hearing impairments [24], and reducing depression, anxiety, and aggression in preschool children [25].

The significance of this research lies in the fact that ADHD has become an intractable problem for psychologists, psychiatrists, parents, and teachers. Its core features, including the inability to inhibit behavior, attention deficit, learning difficulties, aggression, academic problems, motor restlessness, and hyperarousal, are intolerable for parents, teachers, and peers. This disorder is not exclusive to childhood and can persist into adulthood. ADHD is a highly prevalent neurodevelopmental disorder in childhood that, if left untreated, can lead to more serious problems in adulthood. Despite the increasing prevalence of ADHD and the availability of various treatment options, there remains a need for

innovative and effective interventions that address the specific needs of children with ADHD, particularly in the areas of aggression and empathy. While mindfulness-based interventions have shown promise in managing ADHD symptoms, limited research has explored the specific impact of mindfulness-based art therapy on aggression and empathy in this population. Given these points, the aim of the present study was to investigate the effectiveness of mindfulness-based art therapy on aggression and empathy in children with ADHD.

Methods

Design and Participants

An experimental pre-test-post-test control group design was utilized for this study. Participants were 7-12 year-old children diagnosed with ADHD in Amol City, Iran, who sought counseling services at the Child Psychology Counseling Centers in Amol City in 2023. A convenience sample of 44 eligible participants was randomly allocated to experimental (n=22) and control (n=22) groups. Inclusion criteria encompassed parental consent, below-average empathy scores, above-average aggression scores, absence of prior psychotherapy, and no Ritalin use. To ensure accurate participant selection, a comprehensive diagnostic assessment was conducted by experienced clinical psychologists using standardized diagnostic criteria such as the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). This assessment included clinical interviews, behavioral observations, and standardized rating scales to confirm the presence of ADHD symptoms and rule out other potential diagnoses. To minimize the impact of comorbid conditions on the study outcomes, participants were carefully screened for other mental health disorders, such as anxiety and depression. Clinical interviews and standardized rating scales were used to identify and exclude participants with significant comorbid conditions. Participants were excluded if they had a history of psychotropic medication, declined participation, or missed more than two intervention sessions.

Sample size and Randomization

A priori power analysis using G-Power software determined a required sample size of 44 participants to detect a medium effect size ($f = 0.091$) with $\alpha = 0.05$ and power = 0.90. Participants were randomly assigned to the experimental and control groups (n=22) using a random number table generated by software. A list of all eligible participants was created, and a random number table was generated using a computer software program. Participants were sequentially assigned to either the experimental or control group based on the order of numbers in the random number table.

Ethical Considerations

Participants and their legal guardians were provided with clear and comprehensive information about the study's purpose, procedures, potential risks, and benefits. Participants were assured that their participation was entirely voluntary, and they could withdraw from the study at any time without any negative consequences. Written informed consent was obtained from all participants or their legal guardians before the commencement of the study.

Measurement Tools

Child Behavior Aggression Scale

The Child Behavior Aggression Scale developed by Shahim ^[26] was used to assess aggression in elementary school children. This 21-item questionnaire measures overt and relational aggression in elementary school children. The questionnaire is completed by parents, and the items reflect varying degrees of aggression. The questionnaire consists of three subscales: physical aggression (7 items), reactive verbal and overactive aggression (6 items), and relational aggression (8 items). For scoring, the option "rarely" is assigned 1 point, "once a month" is assigned 2 points, "once a week" is assigned 3 points, and the option "most days" is assigned 4 points. Higher scores on the scale indicate higher levels of aggression. In the present study, Cronbach's alpha was used to determine the reliability of the aggression questionnaire, which was found to be 0.84.

The Children's Empathy Quotient

The Children's Empathy Quotient developed by Auyeung et al. [27] was used to assess empathy in children. This 11-item scale employs a 4-point Likert scale ranging from "strongly disagree" to "strongly agree." The scale aims to measure the level of empathy in children. Parents of the participants completed the Child Behavior Aggression Scale, rating their child's behavior on a four-point Likert scale ranging from strongly disagree to strongly agree. Responses indicating a lack of empathy were scored 0, responses indicating mild empathy were scored 1, and responses indicating strong empathy were scored 2. Higher scores naturally indicate a higher level of empathy, and vice versa. A cut-off score of 22 was considered for this questionnaire. In other words, if a participant's score is above 22, it can be concluded that their empathy level is moderate to high, and if the score is below 22, it indicates a lower-than-average level of empathy in the child. In the present study, Cronbach's alpha was used to determine the reliability of the empathy questionnaire, which was found to be 0.87.

Procedure

Before and after the intervention, the parents of the participants completed the Child Behavior Aggression Scale. The questionnaires were administered in person at the Child Psychology Counseling Center by the first author to ensure accurate completion and to address any questions or concerns. In this study, mindfulness-based art therapy was implemented in a 10-session protocol (two 60-minute sessions per week) [28]. A summary of the sessions is presented in Table 1. The therapy sessions were conducted at the Child Psychology Counseling Center in Amol City by the first author, who had completed specialized training in mindfulness-based interventions and art therapy.

Data Analysis

Data were analyzed using analysis of covariance (ANCOVA) as implemented in SPSS version 27. Before conducting the ANCOVA, descriptive statistics, including means and standard deviations, were calculated for all variables. To assess the normality of the data, the Kolmogorov-Smirnov test was used. Levene's test was employed to evaluate the homogeneity of variances across groups.

Table 1. Summary of mindfulness-based art therapy sessions

Sessions	Topic	Content, Techniques, and Session Description
1	Shadow Drawing and Mindful Use of Art Tools	Body awareness, body posture, reading body language, shape drawing, awareness of sensory stimuli, and responding to them.
2	Body Drawing and Mindful Body Language	Body awareness, body posture, reading body language, figure drawing, and intimacy.
3	Imagination and Mindful Thoughts	Imaginative abilities and abstract thinking, paying attention to peers, taking turns, patience, adaptation, and collaborative or agreed-upon painting.
4	Facial Drawing and Mindful Attention	Group selection and collaborative work, attention to faces, attention to detail, and close interaction.
5	Interactive Facial Drawing and Expanding Awareness	Turn-taking practice, practicing patience in collaborative painting, attention to detail, flexibility, interaction, and expanding awareness using painted images.
6	Drawing Each Other and Mindful Bodily Awareness	Familiarity with body parts, familiarity with different figures, increasing patience and tolerance, familiarity with perspective techniques, attention to detail, and acquiring body drawing skills.
7	Painting on Fabric and Mindfulness of Artistic Activity	Identifying individual interests, understanding the concept of a group, and improving fine motor skills
8	Friendship Boxes and Mindful Memory Skills	Acquiring and improving memory skills, and gift-giving.
9	Art Exhibition and Mindfulness	Group discussion, sharing members' experiences, and public display of their achievements to people outside the group, and mindfulness
10	Summary, Post-test	Summarizing the content of all sessions, analyzing children's artistic efforts, and administering the post-test.

Results

The sample comprised 44 children (7-12 years) diagnosed with ADHD. Participants were evenly allocated to experimental ($M = 9.72$, $SD = 3.30$ years) and control ($M = 9.68$, $SD = 4.34$ years) groups. The experimental group, receiving mindfulness-based art therapy, consisted of 16 boys (72.73%) and 5 girls (27.27%). The control group, which did not receive the intervention, comprised 15 boys (68.18%) and 7 girls (31.82%). Table 2 presents descriptive statistics and normality tests for aggression and empathy scores.

Table 2 indicates significant pre-to-post-test changes in aggression and empathy among children with ADHD in the experimental group, with minimal changes in the control group. To determine between-group differences while controlling for pre-test scores, univariate ANCOVA was employed. The absence of outliers, as confirmed by Kolmogorov-

Smirnov tests (Table 2), met normality assumptions for ANCOVA. Levene's test indicated homogeneity of variances for aggression ($F = 0.72$, $P = 0.715$) and empathy ($F = 1.55$, $P = 0.220$). Homogeneity of regression slopes was also supported for both outcomes (aggression: $F = 2.83$, $P = 0.071$; empathy: $F = 0.74$, $P = 0.486$). ANCOVA results examining post-test scores are presented in Table 3.

Table 3 reveals a significant reduction in aggression scores ($F = 326.65$, $P < 0.001$, $\eta^2 = 0.89$) and a significant increase in empathy scores ($F = 357.79$, $P < 0.001$, $\eta^2 = 0.90$) from pre- to post-test assessments within the experimental group, after controlling for baseline differences. These findings support the efficacy of mindfulness-based art therapy in reducing aggression and enhancing empathy in children with ADHD.

Table 2. Means and standard deviations of aggression and empathy in experimental and control groups at pre-test and post-test

Variables	Phases	Experimental group	Control group	Kolmogorov-Smirnov	
		Mean \pm SD	Mean \pm SD	Z	P
Aggression	Pre-test	58.91 \pm 6.97	60.18 \pm 6.12	0.17	0.099
	Post-test	39.82 \pm 5.70	58.27 \pm 5.79	0.12	0.200
Empathy	Pre-test	18.41 \pm 4.95	20.32 \pm 5.97	0.12	0.200
	Post-test	27.50 \pm 5.45	19.77 \pm 4.42	0.21	0.086

Table 3. Results of the ANCOVA on post-test scores of aggression and empathy

Variable	SS	df	MS	F	P	η^2	Power
Aggression	3565.07	1	3565.07	326.65	0.001	0.89	1.00
Empathy	2193.47	1	2193.47	357.79	0.001	0.90	1.00

Discussion

This study examined the impact of mindfulness-based art therapy on aggressive behaviors and empathic responses in children diagnosed with ADHD. The first finding revealed that mindfulness-based art therapy was effective in reducing aggression in children with ADHD. This finding is consistent with the results of previous studies by Lahak and Asadi [22]. However, this finding contradicts the results of some recent studies. For example, Coholic et al. [29] found mixed results in the impact of mindfulness-based interventions on youth, with some improvements in social competence and

emotional regulation but limited changes in self-reported resilience and mindfulness. Similarly, Demir et al. [20] reported positive effects of mindfulness-based art therapy on depression and happiness in patients with migraine but no significant impact on anxiety. The discrepancy between our findings and those of previous studies may be due to several factors. First, the specific components of the mindfulness-based art therapy intervention, such as the duration, intensity, and focus of the sessions, may vary across studies. Second, the characteristics of the study participants, such as age, severity of ADHD symptoms, and comorbid conditions, may influence

the outcomes. Third, the assessment tools used to measure aggression may differ in their sensitivity and specificity. To explain this hypothesis, it can be said that aggression in hyperactive children can be a significant challenge for parents, teachers, and the children themselves. These behaviors may include verbal, physical, or destructive attacks and can have a negative impact on the child's social and academic relationships. In this regard, mindfulness-based art therapy can be an effective tool for reducing children's aggression, with a focus on developing empathy, emotion regulation, and positive communication skills [11]. This approach not only helps children better manage their emotions but also guides them in learning more effective ways to cope with stress and difficult situations.

Mindfulness-based art therapy is a therapeutic approach that utilizes art as a tool to enhance awareness of one's mental state and emotions. Specifically, it assists children and adults in developing a deeper understanding of their personal feelings and experiences, allowing them to express these creatively through art [30]. In mindfulness-based art therapy, the initial phase focuses on cultivating mindfulness of one's present-moment experience. This involves recognizing and acknowledging one's emotions, thoughts, and sensations in the here and now [22]. By creating and examining their artwork, individuals establish a more profound connection with their internal world. Art, serving as a non-verbal language, enables individuals to express their feelings and experiences creatively, free from the pressures of verbal communication. This can be particularly beneficial for children who may struggle to articulate their inner states [20]. Mindfulness emphasizes attention to the present moment and one's mental state and mindfulness-based art therapy further facilitates this process by encouraging individuals to pay close attention to their current experiences. Through this practice, individuals cultivate skills such as emotion regulation and self-awareness.

The research also demonstrated that mindfulness-based art therapy was effective in enhancing empathy in children with ADHD. This finding aligns with the results of previous studies by Centeno [31]. Mindfulness-based art therapy, a person-centered

therapeutic approach that utilizes art as a medium for expressing and facilitating emotions, can significantly impact children's empathy. By increasing awareness of one's feelings and experiences, individuals become better equipped to understand the emotions of others. This skill can contribute to the development of empathy and improved social interactions. Through art therapy, individuals engage in a deeper analysis of their mental states and emotions. This process enables individuals to identify patterns that may contribute to behavioral difficulties and explore ways to improve them. Art therapy helps individuals focus on the present moment and live in the now. This skill can reduce stress and anxiety, guiding individuals toward learning healthier ways to connect with themselves and others [22]. Ultimately, mindfulness-based art therapy is an effective and creative tool for facilitating psychological well-being and promoting empathy and emotion regulation, particularly in children and adolescents.

Mindfulness-based art therapy can be an effective strategy for fostering empathy in children. By utilizing art as a primary tool for emotional expression, this approach can significantly improve children's behaviors and social interactions. Not only does this method help children better manage their emotions, but it also empowers them to develop more positive and empathetic connections with others. Art therapy allows children to express their feelings and mental states. This process educates them to be more attuned to the emotions of others and enhances their ability to empathize [32]. Children who learn emotion regulation skills through art therapy can respond more effectively to their own and others' feelings, leading to more meaningful empathic responses. As a non-verbal language, art can help children better articulate their emotions and foster more dynamic and empathetic connections with others. Group activities in art therapy can provide opportunities for children to connect with others and learn how to express empathy and respond to the needs of others. Accepting and expressing their emotions through art can boost children's self-confidence and enable them to use empathy more consciously in various situations [19]. Teaching empathy and communication skills through art therapy can have a positive and

lasting impact on children's behavior and social interactions as these skills are integrated into their personalities.

This study's findings, while promising, should be interpreted with caution due to its limitations. The sample was drawn from a specific region in Iran, limiting the generalizability of the results to diverse populations. Additionally, the relatively small sample size and the use of self-report measures may have influenced the findings. To fully understand the long-term impact of mindfulness-based art therapy on children with ADHD, further research is needed to explore its effectiveness in diverse settings and to investigate potential underlying mechanisms.

Conclusion

The findings of this study provide compelling evidence for the efficacy of mindfulness-based art therapy in mitigating aggressive behaviors and fostering empathy among children diagnosed with ADHD. Participants in the experimental group exhibited significant reductions in aggression scores post-intervention compared to their pre-intervention levels and the control group. Conversely, empathy scores demonstrated a substantial increase in the experimental group. These results align with previous research highlighting the potential of art therapy as a therapeutic modality for children with ADHD. The integration of mindfulness principles into art-based interventions appears to be a promising approach for addressing the multifaceted challenges associated with this neurodevelopmental disorder. Based on the findings of this study, psychiatrists working with children with ADHD may consider incorporating mindfulness-based art therapy into their treatment plans. This approach can be particularly beneficial for children who struggle with aggression and empathy. Psychiatrists may also consider collaborating with art therapists to develop and implement tailored mindfulness-based art therapy programs. It is important to note that the specific content and duration of the intervention may need to be adapted to the individual needs of each child. Regular assessment of progress and the potential need for additional support, such as medication or behavioral therapy, should also be considered.

Acknowledgments

We gratefully acknowledge the children and their families in Amol City who participated in this study for their willingness and cooperation. We extend our heartfelt thanks to the Child Psychology Counseling Centers in Amol City for facilitating participant recruitment and providing essential support throughout the research process.

Ethical Approval

This research received approval from the Ethics Committee of the Islamic Azad University, Ahvaz branch.

(Approval code: [IR.IAU.AHVZ.REC.1403.058](https://doi.org/10.21860/IAU.AHVZ.REC.1403.058))

Funding

This study was conducted without specific financial support from any funding agency, public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflicts of interest.

References

1. Watters ER, Aloe AM, Wojciak AS. Examining the Associations Between Childhood Trauma, Resilience, and Depression: A Multivariate Meta-Analysis. *Trauma, Violence, & Abuse*. 2023; 24(1): 231-244.
2. Ogundele MO. Behavioural and emotional disorders in childhood: A brief overview for paediatricians. *World J Clin Pediatr*. 2018; 7(1): 9-26.
3. Cipriano C, Naples LH, Eveleigh A, et al. A Systematic Review of Student Disability and Race Representation in Universal School-Based Social and Emotional Learning Interventions for Elementary School Students. *Review of Educational Research*. 2022; 93(1): 73-102.
4. Scott HK, Jain A, Cogburn M. Behavior Modification. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; July 10, 2023.
5. Faraone SV, Bellgrove MA, Brikell I, et al. Attention-deficit/hyperactivity disorder. *Nat Rev Dis Primers*. 2024; 10(1): 11.
6. Hamidia A, Kheirkhah F, Khafri S, et al. A Comparative Study of the Efficacy of

- Methylphenidate and Atomoxetine in Children with Attention-Deficit/Hyperactivity Disorder. *CJP*. 2023; 9(1): 18.
7. Agnew-Blais JC, Wertz J, Arseneault L, et al. Mother's and children's ADHD genetic risk, household chaos and children's ADHD symptoms: A gene-environment correlation study. *J Child Psychol Psychiatry*. 2022; 63(10): 1153-63.
 8. Singh I. A disorder of anger and aggression: children's perspectives on attention deficit/hyperactivity disorder in the UK. *Soc Sci Med*. 2011; 73(6): 889-96.
 9. Chutko LS, Yakovenko EA, Surushkina SY, et al. Impairments to Emotional and Behavioral Regulation in Children with Attention Deficit Hyperactivity Disorder. *Neuroscience and Behavioral Physiology*. 2023; 53(1): 40-6.
 10. Speyer LG, Eisner M, Ribeaud D, et al. A symptom level perspective on reactive and proactive aggressive behaviours and ADHD symptoms in childhood. *J Child Psychol Psychiatry*. 2022; 63(9): 1017-26.
 11. Khodabakhshi Koolaee A, Vazifehdar R, Bahari F, Akbari Me. Impact of painting therapy on aggression and anxiety of children with cancer. *CJP*. 2016; 2(2): 135-41.
 12. Maoz H, Gvirtz HZ, Sheffer M, Bloch Y. Theory of Mind and Empathy in Children With ADHD. *J Atten Disord*. 2019; 23(11): 1331-8.
 13. Lee J, Son JW, Kim S, et al. Disrupted Association Between Empathy and Brain Structure in Attention-Deficit/Hyperactivity Disorder. *Soa Chongsonyon Chongsin Uihak*. 2021; 32(4): 129-36.
 14. Aiello S, Vagni D, Cerasa A, et al. Autistic Traits and Empathy in Children With Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorder and Co-occurring Attention Deficit Hyperactivity Disorder/Autism Spectrum Disorder. *Front Neurosci*. 2021; 15: 734177.
 15. Lasmono A, Ismail RI, Kaligis F, Minayati K, Wiguna T. Empathy Quotient and Systemizing Quotient in Elementary School Children with and without Attention-Deficit/Hyperactivity Disorder: A Comparative Study. *Int J Environ Res Public Health*. 2021; 18(17): 9231.
 16. Cardillo R, Crisci G, Seregni S, Mammarella IC. Social perception in children and adolescents with ADHD: The role of higher-order cognitive skills. *Research in Developmental Disabilities*. 2023; 135: 104440.
 17. Ogundele MO, Ayyash HF. ADHD in children and adolescents: Review of current practice of non-pharmacological and behavioural management. *AIMS Public Health*. 2023; 10(1): 35-51.
 18. Mechler K, Banaschewski T, Hohmann S, Häge A. Evidence-based pharmacological treatment options for ADHD in children and adolescents. *Pharmacology & Therapeutics*. 2022; 230: 107940.
 19. Ramos MC, Macphee FL, Merrill BM, et al. Mindfulness as an Adjunct to Behavior Modification for Elementary-aged Children with ADHD. *Res Child Adolesc Psychopathol*. 2022; 50(12): 1573-88.
 20. Demir V, Eryürek S, Savaş E. The effect of mindfulness-based art therapy on psychological symptoms and happiness levels in patients with migraine: a pilot study. *Current Psychology*. 2024; 43(19): 17664-72.
 21. Cheshure A, Stanwood GD, Van Lith T, Pickett SM. Distinguishing difference through determining the mechanistic properties of mindfulness based art therapy. *Current Research in Behavioral Sciences*. 2023; 4: 100106.
 22. Lahak A, Asadi J. The Effectiveness of Mindfulness Training on Attention and Aggression in Children less than 12 Years Old. *Social Psychology Research*. 2021; 10(40): 1-20.
 23. Sop A, Hançer B. Effects of Mindfulness-Based Practices on Children's Self-Regulation: A Review on Early Childhood Research. *HAYEF Journal of Education*. 2024; 21(1): 66-73.
 24. Fix RL, Fix ST. The effects of mindfulness-based treatments for aggression: A critical review. *Aggression and Violent Behavior*. 2013; 18(2): 219-27.
 25. Loftus T, Mathersul DC, Ooi M, Yau SH. The efficacy of mindfulness-based therapy for anxiety, social skills, and aggressive behaviors in children and young people with Autism Spectrum Disorder: A systematic review. *Front Psychiatry*. 2023; 14(1): 1079471.
 26. Shahim S. Overt and relational aggression among elementary school children. *Psychological Research*. 2006; 9(1-2): 27-44.

27. Auyeung B, Wheelwright S, Allison C, et al. The children's Empathy Quotient and Systemizing Quotient: sex differences in typical development and in autism spectrum conditions. *J Autism Dev Disord*. 2009; 39(11): 1509-21.
28. Seyedesmaili Ghomi N, Sharifidaramadi P, Rezai S, Delavar A. Developing and Assessing the Effectiveness of Painting Therapy Program Based on Mindfulness on Social Skills of High-Functioning Autism Students. *Journal of School Psychology*. 2021; 10(2): 67-84.
29. Coholic D, Eys M, Shaw K, Rienguette M. Exploring the Benefits of an Arts-Based Mindfulness Group Intervention for Youth Experiencing Challenges in Schooling. *Sage Open*. 2023; 13(3).
30. Tao S, Li J, Zhang M, Zheng P, Lau EYH, Sun J, et al. The Effects of Mindfulness-Based Interventions on Child and Adolescent Aggression: a Systematic Review and Meta-Analysis. *Mindfulness*. 2021; 12(6): 1301-15.
31. Centeno RPR. Effect of Mindfulness on Empathy and Self-Compassion: An Adapted MBCT Program on Filipino College Students. *Behav Sci (Basel)*. 2020; 10(3): 61.
32. Hu Z, Wen Y, Wang Y, et al. Effectiveness of mindfulness-based interventions on empathy: A meta-analysis. *Front Psychol*. 2022; 13: 992575.