

Original Article

A Systematic Review of Art Therapy's Effect on Children's Attention Deficit/Hyperactivity Disorder (ADHD) Symptoms

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Abstract

In children with Attention Deficit/Hyperactivity Disorder (ADHD), functional deficits are closely associated with emotional regulation problems, impulsivity, and recurrent patterns of hyperactivity and inattention. Art therapy has emerged as a supplemental intervention for children's emotional, behavioral, and developmental problems in the domains of human services and mental health. This systematic review set out to determine the effectiveness of art therapy in reducing the primary symptoms of ADHD in children. Using databases like SCOPUS, Web of Science, PubMed, Google Scholar, SPORTDiscus, and MEDLINE, a comprehensive literature review encompassing research conducted between 1921 and May 2023 was conducted. Based on the inclusion criteria, which required art therapy to be the primary intervention for managing ADHD symptoms, five studies were selected for analysis. The findings demonstrated that methods such as drawing, making mandalas, and keeping emotional diaries consistently enhanced social skills, attention, and emotional regulation, while also improving the four primary symptoms of ADHD: impulsivity, hyperactivity, inattention, and emotional dysregulation. According to these results, which are backed by psychological theories, incorporating art therapy into clinical settings, school programs, and at-home activities provides a useful, entertaining, and affordable alternative to traditional ADHD treatments. By putting such interventions into practice, kids can learn self-control, become more focused in class, and form stronger bonds with their peers. To optimize these advantages, future studies should improve procedures and assess long-term impacts. Therefore, future research is encouraged to consider this issue when designing interventions.

Keywords

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) remains a significant neurodevelopmental concern among children (Hinshaw et al., 2022). This impulsive disorder is characterized by a pattern of inattention and hyperactivity (Vos et al., 2022). According to available research prevalence in children, 7.6% among 96,907 in aged 3-12 years old was 7.6% among 95% CI: 6.1-9.4%, and among teenagers aged 12-18 years old, there were 5.6% with ADHD (95% CI: 4.8-7%). Prevalence in children and teenagers according to the criterion in the DSM-5 is higher than in the old criteria (Salari et al., 2023). Associated and combined subtypes, such as the hyperactive/impulsive presentation, the inattentive presentation, the issue of impulse inhibition, and the issue of attention regulation, are expected to contribute to the heterogeneous, dramatic presentation of ADHD with the global epidemic (Das et al., 2024). According to the

current literature, stimulant medication and psychosocial treatments are the two primary treatments for school-aged children with ADHD (Ramsay et al, 2017; Chigome et al., 2022). Methylphenidate and dextroamphetamine sulfate, as Pharmacological management and clinical practice guidelines as psychosocial interventions identified as valid treatments (Wong et al., 2019, Liang et al., 2025) In ADHD symptom severity from low to medium, pharmacological treatment has been considered an approved procedure, while combining two treatment methods demonstrated better clinical effectiveness in ADHD treatment (Mechler et al., 2022; Cunill et al., 2022) Art therapy is outlined as an interventional treatment approach for mental well-being and human services to treat a child's difficulties relating to behavior, emotion, and growth (Bosgraaf et al., 2020). It consists of two schools of thought: "art as a remedy" and "art psychotherapeutics" (Choi et al., 2020). In addition, this treatment approach primarily involves applying art-

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interrelated elements, which have been proven in basic research to decrease diverse psychological deficiencies correlated to depression (Karcı & Özel, 2024). The fundamental principles of art therapy are the key factor in visual learning and the provision of an interior medium for convection (Humphreys et al., 2018). The significant application of art therapy in the case of various developmental disability treatments further indicated ADHD's influential use. A preliminary study on the current treatment therapies related to art for ADHD children showed that a diverse scope of ADHD boosts different art tools and commands (Lopes, 2021). For example, Sin Jiah reported that while drawing improves concentration and attention, watercolor painting promotes emotional stability (Sin, 2017). An AI-assisted art exercise was created in Zhang et al.'s study to help kids with ADHD become more attentive. The findings indicate that variable rewards, action, and engagement enhanced concentration and decreased hyperactive behaviors (Zhang et al., 2024).

With a focus on best practices and areas in need of further research, this study attempts to assess the efficacy and suitability of art and music therapy for kids with ASD, HSDD, developmental language disorders, and language learning challenges (Martínez-Vérez et al., 2024). Nematkhan et al. also suggested that clay working decreases these children's aggression (Nematkhan et al., 2017). Similarly, Nasernejad et al. illustrated that Children with ADHD have shown improvements in empathy and a decrease in aggression when receiving mindfulness-based art therapy (Nasernejad et al., 2024). Moreover, Godel indicated that drawing, sculpting, painting, and collage as specific art therapy techniques were the most commonly used in children with ADHD (Godel, 2022). There have been numerous impediments, including motivation of self, expression of self, and self-respect among children with ADHD whose symptoms would be moderated through art therapy techniques. It is withal that the evidence of ADHD alterations during art therapy remains unresolved; consequently, our purpose was to investigate existing verifications regarding art therapy's effect to minimize ADHD symptoms, focusing on psycho-social interferences. We will also evaluate ADHD's implications and contemporary usage in art therapy.

Method

Participants

A systematic literature review was conducted, and pertinent studies that used art therapy as a primary intervention for kids with ADHD were found. Studies were considered if they (1) reported behavioral or emotional outcomes associated with ADHD symptomatology, (2) used art therapy as a primary therapeutic intervention, and (3) concentrated on children with an ADHD diagnosis. Five studies that satisfied the inclusion criteria after the screening process were subjected to qualitative analysis using narrative synthesis. This study investigated the efficacy of art therapy interventions in reducing children's symptoms of

Attention Deficit/Hyperactivity Disorder (ADHD) using a systematic literature review methodology. The purpose of the review was to compile the body of research on the potential effects of art therapy on children with ADHD in terms of attentional control, impulsivity, emotional regulation, and hyperactivity.

Literature research spanning from the year 1921 and going up to May 2023 on SCOPUS, WEB OF SCIENCE, PUBMED, GOOGLE SCHOLAR, SPORTDISCUS, and MEDLINE databases was used to equate relevant research. The following words were used to search relevant research: Art therapy/attention, hyperactivity disorder / attention, Hyperactivity / Attention Deficit / Hyperactivity Disorder/ADHD, and psychotherapy. All relevant research was in the English language. The inclusion criteria in this review were the use of psychosocial interventions in ADHD. All research was needed to thoroughly explain how their art therapy was applied in alleviating symptoms of the disorder. Both males and females participated in the included study.

Procedure

Initially, titles were screened based on the keyword under consideration, and the abstract was scrutinized. The process included exclusion based on similar articles. In step two, the irrelevant articles with complementary approaches and not aligned with the major goals were discarded. If there was a disagreement between the two articles, a third source was consulted to delve into detail.

To extract the necessary information from the selected articles, results were synthesized and presented in Table 1. These hold information on the purpose of the experiment, measurement tools on the variable under consideration, and results. To assess the risk of bias in each research, the tool presented by the Cochrane Collaboration was utilized. Random sequence generation, concealment of the allocation, selective reporting, blinding on the participants, blinding on the measurement of the outcome, and other biases are assigned as items on judgment and are rated on judgment by the author. The results on judgment are presented in Fig. 1, where the risk of the biases was categorized under low, high, and uncertain. The author names in the first row are reference studies, and the color coding in the figure represents green = low risk, unclear, and red = high risk.

Results

Following the application of the inclusion and exclusion criteria, 5 articles were selected for final review from a total of 154 articles (Augustine, 1997; Habib & Ali, 2015; Jesi, 2019; Liao & Liu, 2012; Smitheman-Brown & Church, 1996). All articles were considered eligible. Data from the included articles were taken and presented in a summary in Table 1. After a thorough overview of relevant research, art therapy intervention in ADHD in children could change the severity of problems in such behaviors as impulsivity, inattention, and hyperactivity, reduced impulsive behaviors, enhanced decision-making ability, ability to follow instructions, decision-making and waiting turns, enhanced integration, effort in problem-

solving, attention to detail and developmental level ratings and shows a significant difference in emotional diaries.

Theoretical Interpretation of the Results: The favorable results are consistent with several fundamental psychological frameworks:

Neurodevelopment and executive function Theories: The structured, stimulating nature of art therapy probably helps to strengthen and activate executive control networks, especially in the prefrontal cortex, which are known to be impaired in ADHD (Jesi et al., 2019; Habib et al., 2015). This encourages gains in sustained attention, impulse control, and self-regulation.

Models of cognition and behavior: Increased emotional awareness and reframing lessen maladaptive externalizing behaviors and enhance mood regulation, which is consistent with cognitive-behavioral principles and art

therapy's promotion of self-expression and emotional externalization (Liao et al., 2012).

Social Learning and Developmental Theories: Through observational learning and reinforcement, group-based art activities (Augustine, 1997) support the development of social competence by offering a scaffold for practicing social skills like cooperation, taking turns, and decision-making.

Theories of Expressive Arts and Mindfulness: Drawing mandalas (Smitheman Brown & Church, 1996) uses symbolic and meditative processes that encourage emotional centering, internal integration, and mindfulness, which helps to improve attentional control and lessen hyperactivity.

When combined, these theoretical stances offer a logical justification for the various ways that art therapy may reduce the symptoms of ADHD.

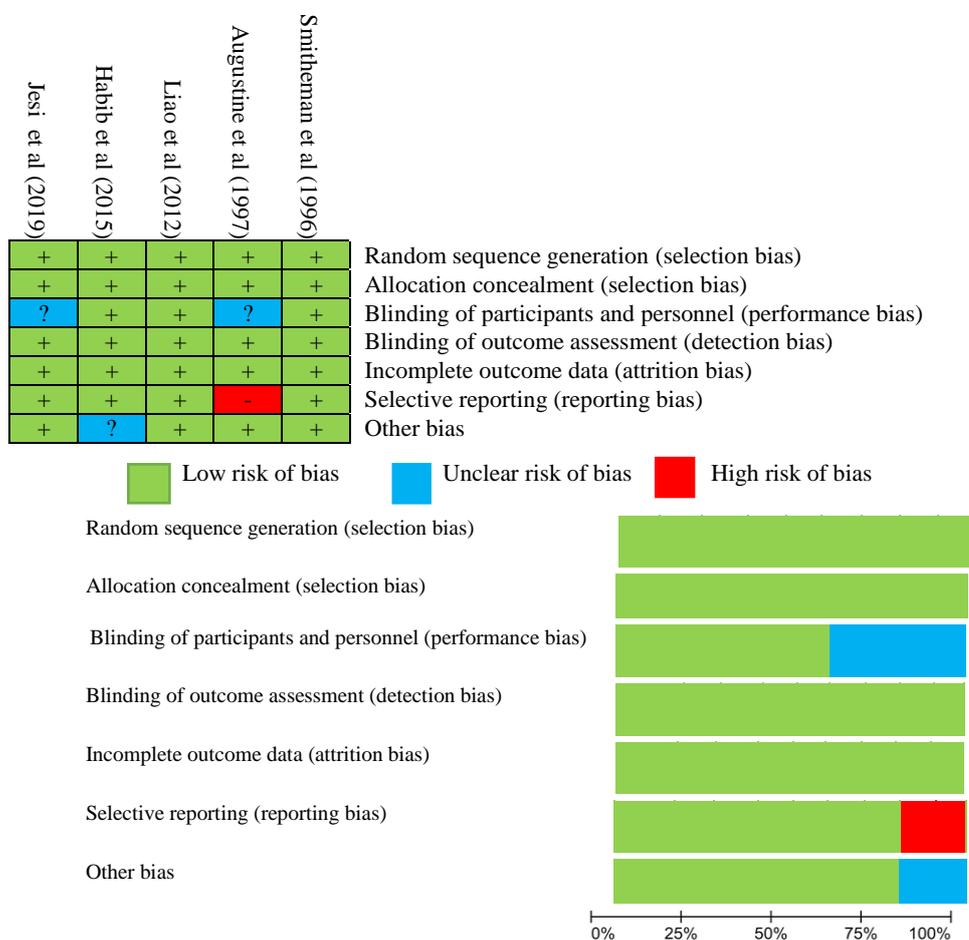


Fig.1. Risk of Bias Assessment

Table 1. Descriptive Analysis of Quantitative Data

Study	Art therapy Intervention (Type, Duration)	Population	Methodology and analyses	Outcome measures	Results
Jesi Y. Benitta (2019)	Drawing and finger painting (30 sessions, once a day, one hour)	Children with ADHD (n=30)	Pre-Post design	The severity of behavioral problems included impulsivity, hyperactivity, and inattention	Significant improvement in post-test scores. These findings suggest that regular engagement in creative activities like drawing can regulate emotional arousal and enhance self-control. According to executive function theory, such interventions may strengthen attention and inhibitory control circuits in the brain.

Habib HA, Ali U (2015)	25 art as therapy sessions	Children with ADHD (n=14)	Pre-Post design	Attention Deficit Hyperactivity Disorder (Gilliam, 1995) and Human Figure Drawing (Koppitz, 1968)	Reduction in impulsive behaviors. This aligns with behavioral self-regulation theory, which proposes that creative expression provides a structured outlet for emotional expression, reducing impulsivity by increasing mindfulness and emotional awareness.
Liao Y., Liu S. (2012)	Emotional diaries and visual imagination Drawing angry self and anger-provoking events	Children with ADHD (n=8)	Pre-Post design	Internalizing and externalizing problems (CBCL) & Angry (BYI-II)	Significant improvements in emotional regulation. This supports the cognitive-behavioral framework, which emphasizes the role of self-reflection and emotional labeling in reducing externalizing behaviors. Drawing allows children to reframe and externalize emotions in a safe, symbolic form.
Augustine (1997)	Practicing social skills through various art tasks (16 sessions, once a week, one hour)	Children with ADHD or learning disabilities (n=8)	Quasi-experimental study	ADHD rating scale included decision-making, making friends, waiting, and following directions	Improved social functioning and executive behaviors. Based on social learning theory, engaging in structured group art tasks provides opportunities to model and reinforce prosocial behaviors like turn-taking and decision-making.
Smitheman Brown, V., Church, Robin P. (1996)	Mandala drawing as an active centering device	A child with ADHD (single-subject)	single-subject, multiple-baseline research design	Creative growth, impulsive behaviors, and attentional abilities	Increased focus, self-awareness, and problem-solving. The use of mandala drawing, rooted in Jungian theory, is believed to support internal integration and calm the mind, aiding in the reduction of impulsivity and improvement in sustained attention.

The chosen studies consistently show that art therapy interventions are effective in lowering the main symptoms of attention deficit hyperactivity disorder (ADHD), such as impulsivity, hyperactivity, inattention, and emotional dysregulation. An overview of the studies is given in the following table, which also explains their conclusions using accepted psychological theories and sound reasoning. The following is a critical examination and discussion of the research biases in Jesi et al. (2019), Habib et al. (2015), Liao et al. (2012), Augustine et al. (1997), and Smitheman et al. (1996). Evaluation of Bias in the Studies is as follows:

1. Random Sequence Generation (Selection Bias): In this domain, every study received a low risk rating (+), demonstrating that suitable randomization techniques were used. Effective random sequence generation reduces the possibility of systematic differences between groups at baseline by ensuring that participants are assigned to intervention or control groups in an unpredictable manner. By lowering confounding variables that could otherwise account for variations in results, this improves internal validity.

2. Allocation Concealment (Selection Bias): In a similar vein, every study showed low risk (+) for allocation concealment, meaning that researchers were able to keep participants' group assignments a secret during participant enrollment. In order to ensure that neither participants nor investigators can alter group assignments based on participant characteristics, allocation concealment is essential for preventing selection bias. The causal inference about how art therapy affects ADHD symptoms is strengthened by this evenly distributed grouping.

3. Blinding of Participants and Personnel (Performance Bias): Due to insufficient reporting on whether participants and staff were blinded to intervention conditions, two studies—Jesi et al. (2019) and Augustine et al. (1997)—

were deemed to have unclear risk. When blinding is not used, performance bias may be introduced, whereby the expectations or actions of participants and therapists may intentionally or inadvertently affect results. Children or therapists who are aware that they are administering or receiving a novel intervention, for instance, may exhibit increased motivation or placebo effects, which could inflate efficacy estimates. This risk was reduced in other studies that reported adequate blinding (+), which raised confidence that the observed effects are due to the intervention and not expectancy effects.

4. Blinding of Outcome Assessment (Detection Bias): Because outcome assessors were successfully blinded to intervention assignment, all studies maintained a low risk (+) for detection bias. This lowers the possibility of subjective bias in outcome measurement, which is a major strength. The objectivity and credibility of the results are increased when assessors are not aware of the group to which participants belong. This is because their ratings or evaluations are less likely to be impacted by preconceived notions.

5. Incomplete Outcome Data (Attrition Bias): Intention-to-treat analyses or other reliable techniques were used to handle missing data, and all studies reported low risk (+) of attrition bias. When missing data or different dropout rates between groups impact the study's results, it can cause attrition bias, which could result in skewed or exaggerated treatment effects. Results are representative of the target study population when attrition is properly managed.

6. Selective Reporting (Reporting Bias): Augustine et al. (1997) were classified as high risk (-) because of evidence or suspicion that certain outcomes may have been selectively emphasized or omitted, whereas the majority of studies demonstrated low risk (+) for selective reporting. This raises questions about whether reported results accurately reflect all measured data, possibly downplaying

negative or null findings or exaggerating positive effects. Selective reporting makes meta-analytic synthesis more difficult and jeopardizes the transparency and comprehensiveness of the body of evidence.

7. Other Bias: Uncertain risk (?) for additional biases was shown by [Habib et al. \(2015\)](#). This could be due to methodological issues that were not fully addressed in the study, such as unmeasured confounding variables, baseline imbalances, or protocol deviations. Internal validity may be impacted by these unknown biases, so care should be taken when interpreting their findings. The other studies, on the other hand, displayed low risk (+), suggesting that there were no discernible extra biases that would compromise the validity of the results.

Discussion

Overall, these studies maintain methodological quality, with low risk in crucial areas such as randomization, allocation concealment, outcome assessment blinding, and attrition handling, according to a thorough bias assessment. Nonetheless, noteworthy issues consist of:

Overall, Bias Risk: Across several domains, the majority of the studies in this review show a low risk of bias, indicating that their findings are generally reliable and strong. This low bias risk increases trust in the beneficial effects of art therapy on ADHD symptoms that have been shown. The completeness and transparency of Augustine et al.'s (1997) findings are called into question due to their notable selective reporting issues. The validity and reliability of the conclusions derived from that study may be jeopardized by such selective reporting.

Performance Bias: There was unclear information regarding participant and staff blinding in two studies ([Jesi et al., 2019](#); [Augustine, 1997](#)). The expectations of participants or therapists may affect reported outcomes in the absence of sufficient blinding, which could inflate effect sizes.

Selective Reporting: According to Augustine (1997), there is a significant chance that some results may have been left out or underreported, which calls into question the accuracy and dependability of the results.

Uncertain Other Bias: [Habib et al. \(2015\)](#) showed unclear risk associated with possible confounding variables, suggesting that future research needs to be more transparent in its methodology.

While acknowledging the general strength and promise of art therapy interventions, these methodological subtleties highlight the significance of interpreting encouraging results with proper caution.

Blinding Issues: Uncertain risk with regard to participant and staff blinding was a feature of [Jesi et al. \(2019\)](#) and [Augustine et al. \(1997\)](#). Performance bias, in which participants' or therapists' knowledge of the intervention may affect behavior or outcome assessments, could be introduced by inadequate or nonexistent blinding in these studies. From a theoretical perspective, expectations and motivation may have a substantial impact on the observed therapeutic effects because art therapy is inherently involving participant engagement. Therefore, it is necessary to interpret these results cautiously due to the

possibility of performance bias.

Unclear Risk in Other Bias: Due to methodological flaws or inadequate control for confounding variables, [Habib et al. \(2015\)](#) presented an unclear risk regarding additional potential biases. This ambiguity highlights the need for more open reporting and strict methodological controls in future studies by raising the possibility that unidentified factors may have affected the results.

Strengths and Weaknesses: All of the studies follow good methodological guidelines, especially when it comes to allocation concealment and outcome assessor blinding, which are essential for reducing biases in detection and selection. These advantages improve the findings' reliability and internal validity. However, some studies have flaws like selective reporting and insufficient blinding, which could influence how the magnitude and generalizability of the effects seen are interpreted.

Theoretical Implications: By improving executive functions, emotional regulation, and social cognition, art therapy can improve core symptoms of ADHD. This idea is supported by the generally low risk of bias. However, it is impossible to rule out the possibility of exaggerated treatment effects or missed adverse outcomes when methodological flaws are present, particularly in relation to blinding and reporting. This emphasizes the need for thorough, open research in the future that builds on this encouraging base.

This systematic review purposed to collect exciting outcomes on art therapy implications to reduce ADHD symptoms. In this study, it was emphasized that all the used studies are related to the main topic through all-inclusive results of the research literature. However, investigations indicated that the number of studies in this field is limited. Therefore, the smaller number of studies can affect the internal validity of the work to some extent, but reporting the limitations of this review study can increase the external validity of the work. ADHD is characterized by a set of inattention and hyperactive-impulsive actions that appear the symptoms before 12 years old. Facilitating the practice of appropriate behaviors by drawing them in cartoon panels can be used as a practical strategy related to behavioral management ([Henley, 1999](#); [Stallard, 2019](#)). This practical strategy usage would improve children's management due to complicated situations through drawing the sequences of events, elevating self-directedness and efficacy. Moreover, some studies have reported that facilitating self-expression is another important factor that could predispose individuals to use art therapy ([Matza et al., 2005](#); [Tan, 2024](#)). In addition, [Park et al.](#) have recently revealed that self-expression can be positively modified by music as art therapy, which not only enhances the therapeutic effect but also can alleviate mental disorders by improving their ability to cope with stress ([Park et al., 2023](#)). Besides the therapy interventions, in children who may experience self-expression and communication problems due to the limited vocabulary of the preschool, gameplay can be the most natural and healthy way ([Kılınç & Saltık, 2020](#); [Solter, 2017](#)). It is well-documented that the other very effective factor in children with ADHD is a disturbance in

emotional regulation (Shaw et al., 2014). Accordingly, Musser et al. indicated that abnormal parasympathetic mechanisms involved in emotion regulation are associated with ADHD in childhood (Morris et al., 2020; Musser et al., 2018). It seems that systematic variation in parasympathetic activity (RSA) depends on both emotional capacity and task demand. Regarding review studies, it has been previously revealed that deregulating emotions separately causes social difficulties related to ADHD in adulthood (Mikaeili et al., 2023). Retz et al indicated that both psychotherapeutic and pharmacological interventions can ameliorate emotional dysregulation by affecting symptoms of inattention and hyperactivity/impulsivity (Lenzi et al., 2018; Retz et al., 2012). These data from different studies suggest that emotional dysregulation is associated with controlling ADHD symptoms. Safran, an art therapist believes that Art can serve as an entry point in revisiting feelings, and ideas or as an entry point in focusing, which can be beneficial for children with ADHD with dysregulated emotions (Bosgraaf et al., 2024; Safran, 2003). Several studies have demonstrated that behavioral function in self-awareness is achieved through art therapy (Javaid et al., 2022; Wu & Sang-Yeol, 2022). Although this factor has not been discussed in many studies, the therapeutic goal of self-awareness improvement directly attends to rising momentous awareness of the mindfulness concept. Self-awareness is often confused in theoretical studies with concepts such as self-awareness, which is fundamentally discussed alongside self-awareness (Morin, 2017). Therefore, self-awareness is the intention and flexibility to face the moment. In addition, it has been investigated that social and emotional impairments in ADHD are reduced through art therapy due to decreased impulsivity and strength in attention-based activities. Studies by Liao & Liu showed that drawing helped children with ADHD to perceive and show their aggression (Liao & Liu, 2012). Although there is some evidence to spotlight the adequate functioning of art therapy in ADHD symptoms, as the limited references to validated psychological interventions. Also, to determine the reaction of visual versus verbal stimuli in children with ADHD, future studies need to be investigated.

Conclusion

Due to the limitations in this available research and a slight methodological variation among this research, a broad conclusion in the field would not be viable. Overall, we could conclude art therapy is a helpful tool in the level of severity of ADHD symptoms and comorbid dysfunction in emotional and social ideas. The findings in this available research would benefit every course in psychology treatment methods.

Expanded Conclusion and Practical Implications:

These studies' convergent evidence points to art therapy as a useful, approachable, and entertaining intervention that can help children with ADHD deal with a variety of complex issues. By combining the cognitive, emotional, and social domains, art therapy promotes holistic development with fewer side effects than pharmaceutical treatments. Behavioral treatment plans that include

structured art therapy sessions can benefit clinicians and educators by promoting better executive functioning, which includes improved impulse control and attention regulation, improved emotional intelligence and control, which lessens irritability, rage, and mood fluctuations, and Enhanced cooperation, peer relationships, and social skills, heightened mindfulness and self-awareness, encouraging serenity and inward concentration.

The results point to important areas for further research for researchers:

To verify effectiveness and identify the precise elements of art therapy that are most helpful, larger-scale, randomized controlled trials with strict blinding and open reporting are required.

The longevity of therapeutic effects and whether art therapy can eventually lessen reliance on medication should be investigated in longitudinal studies.

Neuroimaging studies of neural correlates may shed light on the neurobiological processes underlying the observed behavioral improvements.

Limitations: Recognizing the small sample sizes and the variation in intervention types, durations, and outcome measures among studies is crucial. In order to better compare and synthesize future findings, these factors restrict generalizability and necessitate the use of standardized protocols. This review concludes that art therapy is a promising adjunctive treatment for children with ADHD, as evidence suggests that it can significantly improve psychosocial functioning and reduce behavioral symptoms. For kids with ADHD, art therapy can improve developmental outcomes and quality of life when carefully incorporated into a multidisciplinary care framework. The likelihood that art therapy interventions can improve ADHD symptoms is increased by the generally low risk of bias in important areas like randomization, allocation concealment, outcome blinding, and attrition. Potential biases associated with participant blinding and selective reporting, however, draw attention to the necessity of stricter methodological guidelines in subsequent studies.

In certain studies, especially those where expectations and levels of engagement are important intervention components, like in art therapy, performance bias brought on by inadequate blinding may have exaggerated the effect sizes. Additionally, selective outcome reporting obscures the true effectiveness of interventions and decreases the transparency of findings.

The following should be the top priorities for future research: larger sample sizes to increase statistical power; preregistration of study protocols to reduce selective reporting; transparent reporting of blinding procedures; and comprehensive bias mitigation strategies to optimize internal and external validity.

Future research on the incorporation of art therapy into ADHD management will be stronger and more conclusive if these problems are resolved.

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