

Impact of Sensory and Motor Complementary Program on Severity of Symptoms among Children with Attention Deficit Hyperactivity Disorder

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Abstract

Background: Attention Deficit Hyperactivity Disorder is a prevalent neurodevelopmental disease among children. It is defined by impulsivity, inattention, and/or hyperactivity. Reduction of symptoms' severity of attention deficit hyperactivity disorder through psychological interventions has garnered lots of interest lately. **Aim:** This study examined the impact of sensory and motor complementary program on severity of symptoms among children with attention deficit hyperactivity disorder. **Design:** A randomized controlled trial was used in this study. **Setting:** child psychiatric outpatient clinic at aboo Elrish Children Hospital. **Sample:** A purposive sample of 50 children with attention deficit hyperactivity disorder was randomly assigned, divided into study and control groups, and allocated to 24 sessions of the program designed to mitigate the symptoms' severity of attention deficit hyperactivity disorder. **Tools:** The pretest measures included the Demographic data form, Mini International Neuropsychiatric Interview for Children, and Conners' Parent Rating Scale-Revised: Long Version. The posttest measure included only the Conners' Parent Rating Scale-Revised: Long Version. **Results:** After the program, the study group had a statistically significant reduction in the majority of symptoms with a large effect size compared to the control group. However, there was no statistically significant difference regarding the severity of perfectionism and psychosomatic symptoms which showed a relatively smaller effect size. **Conclusion:** This study indicated that the sensory and motor complementary program was effective in reducing the symptoms' severity of attention deficit hyperactivity disorder. **Recommendation:** Further research with a large sample size is necessary to ensure the generalizability of such interventions.

Keywords: Sensory and motor complementary program, Attention Deficit Hyperactivity Disorder, Children, Symptoms' severity.

Introduction

ADHD is a prevalent neurodevelopmental disease among school-aged children. The chance of an ADHD diagnosis is three times higher among boys than girls. ADHD is defined by impulsivity, inattention, and/or hyperactivity. Children with ADHD commonly experience cognitive and behavioral issues that impact several elements of their well-being, such as physical, mental, social health, and academic performance (Larsson et al., 2023).

ADHD is a clinically heterogeneous disorder due to significant comorbidity with other childhood disorders. 60% to 100% of children diagnosed with ADHD are thought to have one or more comorbid conditions, which frequently continue into adulthood (Gnanavel, Sharma, Kaushal, & Hussain, 2019), including

oppositional defiant disorder (35%), disruptive behavior disorder (28.8%), depressive disorder (13.2%), obsessive-compulsive disorder (9.5%), anxiety disorder (6.1%), and behavior disorder (30-50%) (İpÇİ et al., 2020; Tsujii et al., 2021; Azzam et al., 2021).

In ADHD treatment, both pharmaceutical and non-pharmacological therapies were used. Pharmacological interventions for ADHD are extensively prescribed and exhibit high short-term efficacy. In practice, however, medication treatment may be accompanied by adverse effects including decreased appetite, headache, and gastrointestinal pain (Pang and Sareen, 2021). These side effects contribute to lower medication adherence (Wu et al., 2023).

Thus, there has been a significant rise in the development of complementary interventions

utilized in conjunction with standard medication in recent years. These interventions are characterized by their reduced side effects and high efficacy (Zisman et al., 2020; Cortese et al., 2022). Such as Physical activity interventions (Zang, 2019); neurofeedback interventions (Garcia-Pimenta, Brown, Arns, & Enriquez-Geppert, 2021); and cognitive interventions (Pauli-Pott, Mann & Becker, 2021).

The nurse's involvement in managing ADHD appeared to be varied. Long-term monitoring of children and adolescents with ADHD is highly beneficial. ADHD symptoms fluctuate with development and transitions, such as the transition from elementary to middle and high school. Therefore, maintaining consistent nursing care is emphasized as crucial and encouraged (Kleve, Vårdal, & Elgen, 2022). Nurses were advised to participate in many aspects of ADHD care, such as evaluation, diagnosis, psychological support, medical and non-medical care, and coordinating ADHD services. A compassionate and encouraging approach ought to characterize the contribution of nurses (Anker, Halmy, & Heir, 2019).

Significance of the study

According to epidemiological research, ADHD affects around 7.6% of all children globally (Salari et al., 2023). This frequency is greater in the Middle East and North Africa area, reaching 10.1%-21.8% in Egypt (Al-Wardat, Etoom, Almhdawi, Hawamdeh, & Khader, 2024; Bishry et al., 2018).

It has been demonstrated that children with ADHD frequently suffer a variety of problems including sleep abnormalities, distractibility, motor deficits, impaired social skills, and a lack of academic achievement. These problems are often long-lasting, often persisting even after individuals reach puberty and maturity. As a result, it is extremely harmful to the development of children, compromising their academic progress, socialization process, and physical and mental well-being (Li et al., 2023).

ADHD treatments are becoming increasingly complicated, with a wide range of treatment options available, including medications, behavior management therapies, cognitive training therapies, supplemental interventions, also mind and body interventions. In this context,

the systematic review of the pharmacological and nonpharmacological treatment of ADHD among children and adolescents provides a thorough and extensive examination of 190 research studies. Behavioral therapy was found to be the only non-pharmacological intervention with statistically significant beneficial effects in the treatment of ADHD (Catala-Lopez et al., 2017).

In contrast, other studies had shown that complementary practices such as art-related activities (sensory) and physical exercise (motor) could be effective in improving cognitive function and reducing ADHD symptoms among the children (Jeyanthi, Arumugam, & Parasher, 2019; Mehren, et al., 2020; Bosgraaf, Spreen, Pattiselanno, & Hooren, 2020). Moreover, no studies had been done to far on the effectiveness of combining art activities with exercise to reduce children's symptoms of ADHD. Therefore, more investigations are required to precisely determine how combining physical activity with art-related activities affects the severity of symptoms among children diagnosed with ADHD.

Operational Definitions:

Sensory and motor complementary program: it is the intervention which used in combining with medication therapy. Sensory and motor complementary treatment is arranged as a Mind-body intervention according to Nazarova, Sokolov, Chubarev, Tarasov & Schiöth (2022). Both exercises and art-related activities are assessed together in the current study.

Aim of work

The aim of the current study was to examine the impact of sensory and motor complementary program on severity of symptoms among children with Attention Deficit-Hyperactivity Disorder.

Research Hypothesis

- H1:**Children with Attention Deficit-Hyperactivity Disorder who enrolled in the sensory and motor complementary program will have a lower score on the Conners' Parent Rating Scale than those who received traditional treatment.
- H2:**Children with Attention Deficit-Hyperactivity Disorder who enrolled in the sensory and motor complementary program will have a

lower score on the Conners' Parent Rating Scale post the program than before it.

Subjects and methods

Research Design

A randomized controlled trial was utilized in this study.

Setting

This study was conducted at the child psychiatric outpatient clinic at the Center of Social and Preventive Medicine, located at Aboo Elrish Children Hospital / Japanese Hospital; Faculty of Medicine, Cairo University, Egypt.

Sample

A purposive sample of 50 children with ADHD was recruited. The sample size equation was calculated using the G-power version 3.1.1 for power analysis. A Power of .95 ($\beta=1-.95=.05$) at alpha. 5 (one-sided) were used as the significance level and effect size = (.03).

Participants were selected based on the following criteria: (a) aged between 6 and 12 years old; (b) experiencing symptoms for over one year as reported by the caregiver; (c) on consistent medication and other ADHD treatments for the past two months; (d) functionally independent, capable of understanding, and following instructions.

The exclusion criteria included: 1) children with neurological disorders, intellectual disability, or other chronic medical and primary psychiatric diagnoses (e.g., bipolar disorder, obsessive-compulsive disorder, schizophrenia, schizoaffective disorder, or any other psychotic disorder); 2) children with orthopedic problems (such as scoliosis, kyphosis, pes cavus, or trauma within two months prior to the study); and, 3) children with below-average IQ scores. An IQ test was conducted by a qualified psychologist using the Stanford Binet Test as part of the normal clinical assessment for diagnosing ADHD, and the results were documented in the hospital records.

Recruitment process

A total of 76 participants were assessed for eligibility. Of these potential participants, 23

were excluded, resulting in 53 participants enrolled in the study. Participants were randomly assigned to the study and control groups. Two participants from the study group withdrew during sessions (Figure 1). In addition, one participant from the control group did not fill out the post-test. A total of 50 participants were enrolled in the study.

Tools of data collection

The recruitment process and data collection of this study were carried out at the beginning of November 2023, followed by implementation of the program in 12 weeks starting from the Mid of December to the beginning of Mars 2024.

There were three tools for data collection:

- A. **Demographic Data Form:** it was developed by the researchers and includes the age and sex of the participants.
- B. **The Arabic version of Mini International Neuropsychiatric Interview for Children (M.I.N.I. Kid):** It is a short, structured interview for DSM-IV and ICD-10 psychiatric disorders that was created by Sheehan and Janavs in 1998. It was only used at the beginning of this study to exclude children who with psychiatric comorbidities such as bipolar, obsessive-compulsive disorder, schizophrenia, schizoaffective disorder, or any other psychotic disorder from participating in the study. The Arabic version by Ghanem, Ibrahim, El-Behairy, and El-Merghany (1999) was used in many studies in Arabic countries and was found to be valid and reliable. It includes many diagnostic modules. answers to all the questions with "yes or no".
- C. **Conners' Parent Rating Scale-Revised: Long Version (CPRS-R: L):** It was developed by Conners, (1997) and translated into Arabic by El-Sheikh, (2003). This 80-item scale can be completed by parents. Using a four-point Likert scale, the parents indicate how frequently their kid exhibits the behaviors indicated on the tool. The scale ranges from (Very Often) to (Never). The scale comprises: 1) Seven subscales to assess a variety of ADHD-related behaviors among children, including Oppositional, Cognitive

Problems/Inattention, Hyperactivity, Anxious-Shy, Perfectionism, Social Problems, and Psychosomatic; 2) The ADHD Index is used to identify children who may meet ADHD criteria; 3) The Conners Global Index Total (CGI-Total) includes the CGI Restless-Impulsive and CGI Emotional Lability; 4) The three DSM-IV indices to identify how many DSM-IV for ADHD diagnostic criteria the child fulfills.

Scoring system:

- The CPRS-R was manually scored in around 10 minutes. The scoring sheet converts index raw scores into T scores. Boys and girls have distinct scoring sheets which are aged-specified.
- A score > 70 indicates significantly elevated ADHD symptoms, while score between 66-70 is elevated, scores from 61-65 indicates "high average score", scores from 40-60 indicates "average score" and lastly score <40 indicates "low score". This scale was used as a pre and post-test of the program. The calculated reliability of this tool was 0.94.

The description of the Sensory and motor complimentary program

The Sensory and motor complementary program was specifically developed to alleviate the severity of symptoms associated with ADHD. Therapeutic group sessions were used to implement this program. It was conducted by the main researchers, for 24 sessions, in two weekly sessions over 12 weeks. -The sensory and motor complementary program was developed after reviewing the literature (Chan, Jang, & Ho, 2022; Xie et al., 2021; Bosgraaf et al., 2020; Ahmed, & Mohamed, 2011) and was validated by experts in psychiatric mental health nursing, physical therapy, and psychology specialties. The program comprises introductory, working, and termination phases.

Program phases:

The introductory phase,

Parents were instructed to get involved and support their children during the first session. To reduce children's fear, the session focused on building rapport between researchers and children. This was done with a variety of icebreakers, such as "fact or fiction," "family picture," and "talent show."

Working phase:

Twenty-two sessions of a sensory and motor complementary program were given to the children. 30 minutes of moderate-intensity exercises were used followed by 30 minutes of art-related activities.

The exercise activities, which were implemented by the physiotherapist researcher, included upper limb, lower limb, trunk, and neck aerobic exercises in addition to free running. Ten repetitions for each exercise increase with time. the session lasted for about 20-30 minutes, 5 min for stretching and warming up, 20 min for aerobic exercise, and 5 min for feedback and cooling down. Aerobic exercises consisted of running (shuttle run, zigzag run), and jumping rope (individual and group jumps). The cool-down phase included relaxation exercises to reduce the children's heart rates back to or close to resting levels.

- Every session began with an explanation of the exercise, followed by a demonstration, and ends with two or three reiterations of the exercise done correctly.

Furthermore, **the Art activities** included various activities to direct their energy constructively, increase focus, and promote relaxation, as well as exercises for improving motor and sensory stability. Motor exercises such as walking with a cup of water on the head and standing on one leg. **Visual activities** such as watching a video with feedback, making art from nature- piecing things together, drawing circles that overlap, connecting the dots to build shapes, and sketching on transparency. **Auditory activities**, nature sounds, applauding when you hear a certain letter, and sitting when you hear a certain word. **Tactile activities** as using clay, squeeze balls, and tactile Painting. positive reinforcement was offered to enhance their participation.

Techniques were used for decreasing disruptive behaviors: 1) four guidelines put on walls and repeated at the start of each session (respect people, places, and things; be where you're supposed to be; obey orders; participate positively); 2) Parents received Good News Notes and Stars of the Day Awards for good conduct; 3) monitored timeout for aggressive behavior.

Termination phase: the last session included activities such as “Write goodbye letters to one another”, with a small party. The children were evaluated using Conners’ Parent Rating Scale-Revised: Long Version after finishing the program.

Ethical consideration

This study was approved by the ethical research committee, faculty of physical therapy, Cairo University (No: P.T.REC/012/004970). Written informed consent was obtained from the parents of the participants after a complete description of the purpose and nature of the study. All of them were notified that their involvement in the study is voluntary and they have the option to withdraw at any point. Allocation of coding numbers for each participant was used to ensure anonymity and confidentiality.

Procedure

After obtaining the ethical approval, official permission to conduct the current study was obtained from the child psychiatric outpatient clinic at the Center of Social and Preventive Medicine in Aboo Elrish children hospital / Japanese Hospital.

The researchers met with the parents of the potential participants who might be interested in taking part in the study, explained the purpose of the study, assured them about confidentiality and anonymity and finally invited them for participation.

- Written informed consent was obtained from each parent of the children before data collection. Then, a baseline assessment was carried out by using the selected tools, each participant was interviewed individually in a semi-structured interview for about 30-45 minutes.

After that, the participants were divided randomly into two groups, the study group (who received the sensory and motor complementary program) and the control group (who received traditional treatment that did not include physical exercise or any art-related activities during the program implementation period). The randomization process was done by the statistician to perform the allocation concealment. So, neither the researchers nor the children nor their parents know who would be assigned to each group. After completion of the program, the post-test for both groups were done by a masked trained investigator.

Statistical analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS), version 20. data were expressed as a mean, standard deviation, frequency, and percentage. A paired t-test was used to test the difference between pre and post-means in each group, and a Chi-square test was used to test the difference between the two groups regarding age and gender. The effect size was calculated to study the effect of the program. Any test was considered significant if $p\text{-value} < 0.05$.

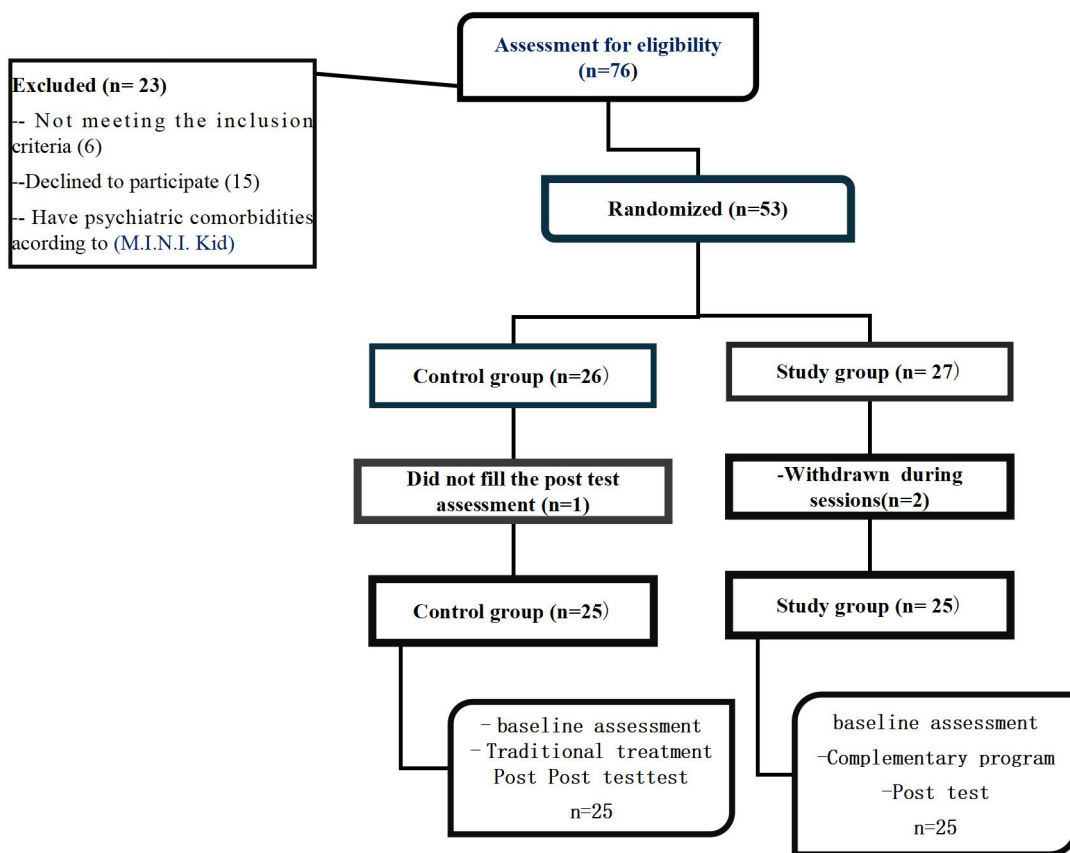


Figure (1): Flow Chart of the randomized controlled trail

Results

According to demographic data presented in table (1) the mean age the study group was 8.01 ± 2.1 ; 16 (64%) males. While the mean age of the control group was 8.2 ± 1.8 ; 15 (60%) were males. There were no significant differences between the study and control groups with respect to gender ($p = 0.77$) and age ($p = 1.0$).

Regarding the impact of the program on the study group, table (2) revealed that a statistically significant improvement was revealed regarding the severity of oppositional symptom, cognitive problems, hyperactivity, anxiety, social problems after receiving the program. In addition to the statistically significant improvement in restless-impulsive, ADHD index, Conners Global Index Total, and the three DSM-IV indices. As regards perfectionism and psychosomatic symptoms, there was an improvement after receiving the program, but this improvement was not statistically significant.

For the control group, table (3) showed there were statistically significant improvements regarding the severity of the hyperactivity, social,

restless-impulsive, and total Conners' global index after receiving the traditional treatment as ($p = .028, 0.021, 0.009, \& 0.022$) respectively. With no statistically significant improvement regarding oppositional, cognitive, anxiety, perfectionism, psychosomatic symptoms, and ADHD index, Conners Global Index Total, and the three DSM-IV indices after receiving the traditional treatment.

The current study findings indicated the practical significance of the program as shown in Table (4). The large effect sizes within the study group indicated a significant reduction in ADHD symptoms' severity after receiving the program, except for perfectionism and psychosomatic symptoms, which show relatively smaller effect sizes (0.67, & 0.61) respectively. While small to medium effect sizes were observed within the control group after receiving the traditional treatment. Furthermore, the program effectiveness was noted as there was a large effect size between the two groups except for perfectionism, social problems, and psychosomatic symptoms (0.20, 0.58, & 0.11) respectively.

Table (1): Demographic data of studied sample

Demographic data	Study group (n=25)	Control group (n=25)	X ²	p
	No (%)	No(%)		
Gender				
Males	16(64%)	15(60%)	0.08	0.77
Females	9(36%)	10(40%)		
Age				
6<8	7(28%)	10(40%)	0.0	1.0
8-12	18(72%)	15(60%)		
Mean±SD	8.1±2.1	8.2±1.8		

Table (2): Severity of the ADHD symptoms pre and after the complementary program for the study group as measured by CPRS -R:L.

ADHD dimensions	Baseline	Study group Post test	T	p-value
	Mean ± SD	Mean±SD		
Oppositional	75.40±7.87	60.44±6.51	7.323	.0001*
Cognitive problems	71.88±5.70	58.72±5.00	8.678	.0001*
Hyperactivity	68.68±6.68	56.36±5.21	7.270	.0001*
Anxious	68.64±4.99	57.36±4.00	8.819	.0001*
Perfectionism	65.44±10.99	58.08±7.70	2.742	.009*
Social problems	72.16±5.90	59.52±6.13	7.428	.0001*
Psychosomatic	66.72±9.78	60.72±7.17	2.473	.017*
ADHD index	69.36±7.47	56.60±5.43	6.910	.0001*
CGI: restless-impulsive	69.08±6.26	56.60±4.59	8.040	.0001*
Emotional lability	68.76±8.16	56.24±5.32	6.427	.0001*
CGI Total	69.36±5.96	58.84±6.04	6.197	.0001*
DSM in attention	71.28±5.57	63.72±6.63	8.778	.0001*
DSM hyperactivity	72.80±5.95	63.64±6.69	9.474	.0001*
Total score	72.72±6.06	65.08±6.08	9.725	.0001*

CGI: Conner's Global Index; ADHD: Attention Deficit Hyperactivity Disorder, DSM-V: Diagnostic and Statistical of mental Disorder fifth edition

Table (3): Severity of the ADHD symptoms pre and after the traditional treatment for the control group as measured by CPRS -R:L

ADHD dimensions	Baseline	Control group Post test	t	p-value
	Mean ±SD	Mean ± SD		
Oppositional	73.60±6.78	70.96±7.51	1.304	.198
Cognitive problems	71.04±4.94	68.48±6.29	1.602	.116
Hyperactivity	69.12±4.48	65.88±5.55	2.271	.028*
Anxious	64.76±6.16	62.88±6.19	1.076	.287
Perfectionism	59.68±8.69	60.28±8.56	0.247	.807
Social problems	66.84±5.52	62.96±5.97	2.386	.021*
Psychosomatic	61.64±8.37	59.64±7.38	0.896	.375
ADHD index	69.76±4.72	67.56±4.85	1.626	.111
CGI: restless-impulsive	68.16±2.84	65.96±2.88	2.721	.009*
Emotional lability	68.28±3.51	66.32±3.86	1.880	.066
CGI Total	68.80±3.42	66.24±4.17	2.376	.022*
DSM in attention	68.76±3.47	67.00±3.51	1.783	.081
DSM hyperactivity	70.72±4.53	68.28±5.65	1.685	.098
Total score	72.72±5.56	70.32±6.72	1.376	.175

*Significant at p-value<0.05

Table (4): Effect size in both groups and between groups

ADHD Dimensions	Study group	Control group	Between the two groups
Oppositional	1.90*	0.39	1.34*
Cognitive problems	2.31*	0.52	1.71*
Hyperactivity	1.84*	0.72	1.43*
Anxious	2.26*	0.31	1.11*
Perfectionism	0.67	0.07	0.20
Social problems	2.14*	0.70	0.58
Psychosomatic	0.61	0.24	0.11
ADHD index	1.71*	0.47	1.47*
CGI: restless-impulsive	1.99*	0.77	1.50*
Emotional lability	1.53*	0.56	1.24*
CGI Total	1.77*	0.75	1.24*
DSM in attention	1.23*	0.51	1.65*
DSM hyperactivity	1.44*	0.54	1.76*
Total score	1.25*	0.43	2.04*

Discussion

The research aimed to prove the effectiveness of the sensory and motor complementary program in reducing the severity of symptoms among children with ADHD. The results suggest that the symptoms' severity among the study group decreased with significantly differed from the control group following the program implementation.

Regarding demographic characteristics of the sample, the current study showed an increase in the number of boys with ADHD compared to girls. This result is supported by a substantial number of studies on children with ADHD included (Benzing & Schmidt, 2019; Ayano, Yohannes, & Abraha, 2020; De Rossi et al., 2022) which showed a large enough sample size indicated that males were more likely to develop ADHD than girls. According to the researchers, this outcome could be explained by the possibility that girls are underdiagnosed because males are more likely to display impulsive and hyperactive symptoms, while girls are more likely to be inattentive and exhibit internalized symptoms like psychosomatic symptoms and perfectionism.

Children with ADHD who received the sensory and motor complementary program demonstrated a significant reduction regarding the severity of oppositional, cognitive, hyperactivity, anxiety, social problems, and inattention. This finding is in line with the finding of a study done by Mehren, Reichert, Coghil, Müller, Braun, and Philipsen's (2020) who found that physical exercises help to reduce impulsivity, attention, and cognitive symptoms. Also Zang (2019) in a study demonstrated that physical activity

dramatically reduced anxiety, as well as social and cognitive problems among children with ADHD. Similarly, in a trial done on 37 children with ADHD aged between 8 to 11 years old, reported that the cognitive function improved considerably after 8 weeks of exercise training that comprised perceptual-motor training and 20 minutes of moderate-intensity interval exercises. Similarly, the finding of a study done by Xie et al., (2021) who reported that meta-analysis found a substantial decrease in behavioral, affective, inattention, hyperactivity, and impulsive symptoms among children with ADHD.

In addition, Che, Jong-Hwan, and Shang (2021) conducted a meta-analysis of 83 studies about ADHD involving 4,996 subjects and 14 non-drug treatment studies; the results revealed that physical exercise training improves the symptoms of attention deficit hyperactivity disorder most effectively and sparingly. In contrast, the current finding is partially congruent with the results of a study done by Sun, Yu, and Zhou (2022), who examined 15 randomized controlled trials (RCTs) involving 734 participants and concluded that physical exercise could enhance the attention of children with ADHD. However, hyperactivity, social problems, and impulsivity remained unaffected.

Moreover, in a study done by Hoza et al. (2015) examined the effects of art and physical activity therapies on ADHD symptoms. The study finding found that children with ADHD in the art and physical activity intervention groups had fewer symptoms after the program implementation. Also the finding of a study done by El-Nagger, Abo Elmagd, and Ahmed (2017)

who reported that art activities improved attentional ability, hyperactivity, emotional disturbances, and impulsivity among children with ADHD. This improvement was observed by the teachers and parents. Another research done by Alamdarloo, Shojaee, Shalani, Hossein, and Khanzadeh (2016) who evaluated how art therapy affected children with ADHD, as the average aggression and impulse scores diminished significantly. Furthermore, in a study done by Tang (2021) found that art therapy helped children express themselves nonverbally.

The results of the current study indicated that the reduction in perfectionism and psychosomatic symptom severity among the study group did not reach the level of statistical significance. The findings could be interpreted by using social learning models (Bandura, 1986) in addition to the cognitive theory which proposed by Beck, Rush, Shaw, and Emery (1979). The first thing that children learn from their relationships with adults is that they need to perform up to their parents' and teachers' high standards of accomplishment if they want to feel appreciated. Consequently, they are always working to attain that level of greatness so that they could be approved and accepted. This creates a mental pattern called perfectionism that children always use to rate every task they do. This way of thinking is triggered when they do something wrong that is not perfect in their surroundings. It leads to skewed perceptions of reality, which in turn causes emotional pain and psychosomatic symptoms. This finding highlights the importance of teaching parents to avoid criticism and help their children express their fears and concerns to reduce the severity of perfectionism and psychosomatic symptoms.

Conclusion

In conclusion, the sensory and motor complementary program has shown to be an important intervention for reducing symptoms' severity among children with ADHD. This study concluded that the combination of exercises and art activities was effective when integrated with pharmacological treatment.

Recommendation

- For future research, it is highly recommended to assess the predictive factors for perfectionism and psychosomatic symptoms among children with ADHD.

- Parent Counseling and Psychoeducational interventions are recommended to maximize the benefits of ADHD treatment.
- Additional research is required to achieve the generalizability of these interventions.

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