Harmonizing The Mind And Body: Exploring The Impact Of Yoga And Meditation On ADHD Symptomatology

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Abstract:

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by persistent inattention, hyperactivity, and impulsivity patterns. While pharmacological interventions have been a primary approach to managing ADHD symptoms, there is growing interest in complementary and alternative interventions such as yoga and meditation. This research article investigates the impact of yoga and meditation practices on ADHD symptoms. A preliminary systematic review of quantitative and qualitative data from various research studies suggests a significant reduction in ADHD symptom severity post-intervention. Improvements were also observed in cognitive functions related to attention and impulse control. These findings suggest that yoga and meditation interventions have the potential to positively impact ADHD symptoms and the overall well-being of individuals with ADHD. Integrating mind-body practices into traditional ADHD treatment approaches holds promise for providing a holistic and sustainable approach to symptom management. However, further research with larger and more diverse samples is warranted to validate and generalize these results.

Introduction

ADHD is a frequently occurring neurobiological and neuropsychiatric disorder among children of school age. It has a high prevalence rate of approximately 5-8% in children. ADHD is characterized by developmentally inappropriate levels of inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2013). Children with ADHD have difficulties in interpersonal relationships and impaired social skills. They also have poor academic performance and exhibit deficits in working memory, attention, emotional regulation, and response inhibition (Chimiklis et al., 2018). Also, almost 60% of kids with ADHD grow into adulthood with their ADHD symptoms. So, 4% of adults have ADHD (Chou & Huang, 2017).

Typically, ADHD is treated with medications that increase thinking and attention-stimulating catecholamines like dopamine and epinephrine (National Institute of Mental Health, 2016). Given the prevalence of childhood ADHD, the effectiveness of various treatment modalities has been explored. Though pharmacological treatments are most common, they also have many side effects that lead to the irregular use or discontinuation of medication. According to a meta-analytic review on the impact of ADHD medication, side effects like sleep disturbances, poor appetite, mood disorders, tics, cardiovascular symptoms, seizures, suicidal ideations, and psychotic symptoms were all reported (Cortese, 2020; Cortese et al., 2013).

Complementary and Alternative Medication (CAM):

The two most commonly used evidence-based interventions for ADHD are psychosocial (behavioral) and pharmacological interventions (Chimiklis et al., 2018). Though both kinds of interventions are effective, there is a lack of significant improvement in academic achievement and executive functioning (Evans et al., 2018; Jarrett & Ollendick, 2012; Langberg & Becker, 2012; Steeger et al., 2016). Parental concerns about the side effects of stimulant medication on the child's health have steered many parents towards nonmedication treatments either as complementary and alternative medical treatment or as a part of a multimodal management plan for ADHD.

CAM treatments of significance are Diet, omega-3 (DHA/EPA), probiotics, vitamins, aroma therapy, mind-body medicine, neurofeedback, massage, yoga, meditation, music therapy, homeopathy, etc.

Pictorial representation of various Complementary and Alternative Medication (CAM) Treatment Options



Multimodal management of ADHD:

Multimodal management of ADHD can include using a combination of many different management modalities like Classroom management, medication, academic coaching, social skills training, and parenting training.

Pictorial Representation of Multimodal Management of ADHD



Yoga and Meditation as CAM / Multimodal Management Options:

Yoga:

Yoga is a mind-body practice from ancient India that has been elaborately described in Patanjali's "yoga sutra" from 900 BC. Rishis developed yoga in India over 5000 years ago (White, 2012). Yoga can help with self-control, attention, stress management, and physical fitness (Kimbrough et al., 2007).

Yoga comprises various Asanas (physical postures), Pranayama (breath control), Yoga Nidra (deep relaxation), and Dhyana (meditation). Yoga could be used in academic and therapeutic settings (Ferreira-Vorkapic et al., 2015). According to (Khalsa et al., 2011), a yoga program helps children gain self-esteem, confidence, mental health, positive attitudes, and focus, decreasing stress and anxiety.

Meditation:

According to the NCCIH (National Center for Complementary and Integrative Health), Meditation is an

age-old practice that began in Eastern traditions. Meditation refers to various techniques that focus on integrating the mind and body. It is used to calm the mind and promote mental health. Meditation involves focusing on a particular sensation, like our breath, a sound, an image, or any mantra, that is, the repetition of a word or phrase. Mindfulness is another form of meditation that involves maintaining the focus or awareness of the present moment without being judgmental.

Meditation or mindfulness programs can also be combined with the practices of other activities. For instance, mindfulness-based stress reduction is a program that includes mindful meditation, discussion sessions, and different strategies to help people in stress reduction. Mindfulness-based cognitive therapy is another program that integrates mindfulness practices with concepts of cognitive behavioral therapy (NCCIH, 2022).

The ringing of tingsha bells, breathing/sitting meditation, yoga warm-ups, postures, affirmations, etc., are different forms of meditation (Ferreira-Vorkapic et al., 2015). Mindfulness meditation refers to the state of being aware of one's thoughts and feelings. Unlike other treatments, mindfulness meditation is an economical and easily accessible technique for children and adults with ADHD.

Mechanism of Yoga and Meditation:

It has been reported that the practice of yoga increases slow-frequency brain wave activity (Arambula et al., 2001), better heart rate (HR) variability, perceived stress, depression, and aerobic fitness (Satin et al., 2014), and a significant decrease of cortisol, and increase BDNF (Brain Derived Neurotropic Factor), serotonin and dopamine (Pal et al., 2014). On the whole, regular yoga practice reduces the activation of the sympathetic nervous system and increases the activation of the parasympathetic nervous system. This phenomenon promotes the mind-body equilibrium, improving emotional self-regulation (Streeter et al., 2012). These studies also provide significant empirical evidence supporting the impact of yoga on ADHD by reducing inattention and impulsivity. Telles and Singh, 2013, have provided evidence supporting the inhibitory function of yoga (Telles & Singh, 2013). Regular yoga practice strengthens the prefrontal cortex, which typically reduces functionality in people with ADHD. As the pre-frontal cortex supports, it enhances decision-making, planning, and focus (Medical News Today, 2021).

Yoga could also contribute to interference control, inattention, and response speed of people with ADHD (Halperin et al., 2014), (Chou & Huang, 2017). Yoga has also been associated with reduced cortisol and increased BDNF, dopamine, and serotonin (Pal et al., 2014). The yoga group exhibited a quicker reaction time and improved accuracy on the visual pursuit test compared to the control group (Chou & Huang, 2017). Overall, this study found that yoga practice comprising control of breath, posture, body balance, and focus resulted in enhanced attention, interference control, and attention shifting (Chou & Huang, 2017).

In a 2019 meta-analytic review, the researchers compared the results of brain imaging studies and observed that the brains of individuals who regularly practiced yoga had structural and functional improvements in parts of the brain, such as

- The hippocampus, which processes memories and helps in learning
- The amygdala, which aids in processing emotions
- The pre-frontal cortex, which facilitates executive functioning, memory, language skills, acquisition of knowledge, and awareness of time

Wholistic benefits of Yoga:

Consistent yoga practice offers multiple physical and mental health benefits, like weight management, elimination of tension headaches, and lower back and neck pain relief. It also helps reduce irritability, anxiety levels, asthma, stress, depression, and crying. Yoga also helps build self-confidence and esteem, enhancing focus, spatial memory, executive functioning, and other cognitive benefits (Medical News Today, 2021). According to (Khalsa et al., 2011), yoga helps to build self-confidence and esteem, better mental health, a positive mindset, and reduces stress and anxiety. Telles et al. (Telles et al., 2013) found that yoga also helped in physical fitness, cognitive performance, self-esteem, and teacher-rated behavior in 98 schoolchildren aged 8 to 13 years. (Verma et al., 2014) observed significant improvements in mental ability and memory among high school students in the age group of 11 to 15 years, who were randomly divided into yoga and control groups.

For children who deal with stress, anxiety, trauma, abuse, learning disability, and bullying, meditation, and contemplative practices lead to a more academically and socially successful life (Ramadoss & Bose, 2010).

Impact of Yoga on ADHD:

Yoga is a highly feasible intervention for ameliorating ADHD symptoms like inattention and bad adaptive skills in school for children with emotional and behavioral disorders (Steiner et al., 2012). For children with ADHD, a single session of exercise has been seen to bring about better response preparation (Chang et al., 2014) and switching between tasks (Chou & Huang, 2017)(Huang et al., 2016).

Yoga also helps children to improve their selfesteem, confidence, mental health, positive attitudes, focus, stress, and anxiety (Telles et al., 2013) (Khalsa et al., 2011). Yoga enhances attention, executive functions, selfesteem, memory, cognitive functions, and mental health (Sarokte & Rao, 2013) and (Telles et al., 2013), and (Verma et al., 2014). Hayes and Chase performed an in-depth review of the literature and figured that yoga helped reduce stress and anxiety (Hayes & Chase, 2010). Vinyasa yoga leads to the regulation of blood pressure (BP), heart rate (HR), and behavioral stressors (Hagins et al., 2013). The overall mood anxiety, stress, anger, self-control, resilience, mental health, etc. (Khalsa et al., 2011; Noggle et al., 2012).

Regular yoga helps strengthen the pre-frontal cortex, the part of the brain that is smaller or has reduced functioning in people with ADHD, and helps enhance decision-making, planning, and focus (Gothe et al., 2019). In

one 2017 study, reaction time and attention improved after eight weeks of weekly yoga. These findings suggest that Yoga can be an effective Complementary Therapy in addition to medication and other psychological treatments (Chou & Huang, 2017). Another 2019 study found that 12 weeks of yoga improved symptoms of hyperactivity and inattention (Barranco-Ruiz et al., 2019).

However, a comprehensive review of multiple studies found that though many studies concluded that yoga helped children with ADHD, they did not observe a diverse sample of children. In this context, it needs to be further studied how yoga can benefit a broader spectrum of the population (Barranco-Ruiz et al., 2019).

Another 2018 study dealt with preschoolers with Inattentive ADHD who did yoga three to four times a week and experienced a reduction in inattention and hyperactivity (Cohen et al., 2018).

Impact of Meditation on ADHD:

Yoga and meditation result in psychophysiological effects such as emotional self-regulation, reduced depression, anxiety and stress levels, and post-traumatic disorder (Cabral et al., 2011; Chong et al., 2011; Telles et al., 2010; Ferreira-Vorkapic et al., 2015).).

Regular contemplative techniques enable children to deal with anxiety, trauma, stressors, abuse, learning disabilities, and bullying (Ramadoss & Bose, 2010). White found that mindfulness meditation helps reduce stress and develop coping mechanisms, self-esteem, and focus (White, 2012).

Simple Yoga Asanas to Reduce ADHD Symptoms:

Yoga can be a beneficial tool to help manage ADHD symptoms by promoting relaxation, increasing focus, and mind-body synchrony.

After a thorough review of the literature, the following yoga poses were found to be some of the most commonly practiced poses among kids and adults with ADHD - Child's Pose (Balasana), Tree Pose (Vrikshasana), Cat-Cow Pose (Marjaryasana/Bitilasana), Downward-Facing Dog (Adho Mukha Svanasana), Corpse Pose (Savasana), Seated Forward Bend (Paschimottanasana), Seated Forward Bend (Paschimottanasana), Easy Pose (Sukhasana) and Easy Pose (Sukhasana).

Recommendations for ensuring consistency in yoga and meditation practice, based on the analysis and synthesis of extant literature:

- Include warm-up exercises like one breathing technique, yoga poses, or both to mark the beginning of the class.
- Include flexibility for children practicing yoga, including the duration of practice and the accuracy of poses.
- Avoid being a stickler for the exact pose, but instead attach more importance to the feeling associated with the pose rather than how it is supposed to look.
- Customize the vigor of physical strain and duration of yoga or breathing practice.
- Pace the instruction of new yoga or deep breathing practices according to the individual child, student, or adult's capabilities.
- Allow for modification of poses and breathing exercises according to student preferences.
- Students can also rename familiar yoga poses according to their creativity to understand and remember better.
- Feel free to use simple language and substitute the Sanskrit names for various yoga poses with student-friendly English words.
- Keep the sessions exciting and playful.
- Include mini-lessons on yoga / deep breathing as part of the lesson plan.

Recommendations for future research:

- 1. Conduct research to identify the clinical applications of yoga and meditation.
- 2. Randomized Controlled Trials (RCT) should be promoted to prove the positive influence of yoga and meditation.
- 3. Quantifying effect sizes of yoga and meditation interventions ensures the reliability and validity of test results.

4. Extend research on the impact of yoga and meditation on children with ADHD to include adults with ADHD.

Conclusion:

After thoroughly reviewing many research articles, researchers concluded that primary care physicians should prescribe yoga to improve physical and mental health (Diamond, 2012).

Hence, yoga is not just a physical practice but also a practice that involves connecting with the breath and being present in the moment. Maintaining consistency and regularity of approach without straining too much positively impacts ADHD symptoms. In the initial days, it is better to join a yoga class or practice with an experienced yoga instructor to ensure the correct postures align with the specific breathing techniques.

In conclusion, this research article sheds light on the potential of yoga and meditation profound as complementary and alternative interventions for alleviating ADHD symptoms. The evidence demonstrates a promising correlation between regular yoga practice and mindfulnessbased techniques with improvements in attention, impulse control, and emotional regulation among individuals with ADHD. While further longitudinal studies and randomized controlled trials are warranted to establish definitive causal relationships, the current body of research highlights the value of incorporating yoga and meditation into holistic treatment approaches for ADHD. These practices offer a holistic avenue for managing symptoms and empower individuals with valuable self-regulatory tools to enhance their overall well-being and quality of life. As the understanding of neuroplasticity and mind-body interactions continues to grow, embracing yoga and meditation alongside conventional interventions like medication or pharmacological interventions and behavior therapies may pave the way for a more comprehensive and effective approach to managing ADHD in both children and adults.

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Conflict of Interests

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