RESEARCH PAPER

Effect of Sukshmavyayama (Yoga for Relaxation) As a Therapeutic Intervention for Improving Hyperactivity in Children with Attention Deficit Hyperactivity Disorder

Ashwini B[1*] and Dr. Neelam K Sharma[2]

[1]*PhD scholar, Lovely Professional University, Phagwara*
[2]*Associate Professor and Head-Department of Physical Education, Lovely Professional University, Phagwara*
***Corresponding Author:** Ashwini B, PhD scholar (Physical Education), Lovely Professional University, Phagwara*
ashwinibheemani@gmail.com

Received: 17th Dec, 2025; Revised: 10th Feb 2026; Accepted: 12th Feb, 2026; Available Online: 30th March, 2026

ABSTRACT

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is a neuropsychiatric condition marked by reduced attention, hyperactivity, and impulsivity affecting 5-7% of children worldwide (American Psychiatric Association, 2013). These symptoms can adversely affect a child's academic, social, and emotional well-being. Conventional treatments often involve medications and behavioral therapies, they often yield side effects like insomnia or appetite suppression (Swanson et al., 2007); thus alternative interventions, such as Sukshmavyayama a subtle yoga practice emphasizing mindful movements and relaxation (Harbourside Yoga, 2023), have gained attention for their potential in managing ADHD symptoms.

Objective: This study aims to evaluate the effectiveness of Sukshmavyayama; as a therapeutic intervention for improving ADHD symptoms, focusing on hyperactivity in children.

Method: A randomized controlled trial (RCT) was conducted on children aged 6-12 years diagnosed with ADHD. Participants (N=20) were divided into a Sukshmavyayama intervention group (10) and a control group (10). The intervention group practiced Sukshmavyayama (30-minute sessions, 3 days/week) for six weeks. Symptom severity was measured pre- and post-intervention using the DT-ADHD rating scale, focusing on hyperactivity subscale scores.

Results: A Mann-Whitney U test revealed no significant difference between the Sukshmavyayama and Control groups at pre-test ($U = 40.5$, $p = .467$). However, at post-test, the Sukshmavyayama group demonstrated significantly lower hyperactivity scores than the Control group ($U = 0.00$, $p < .001$).

Conclusion: The results suggest that Sukshmavyayama is an effective alternative therapy for children with ADHD, improving self-regulation, reducing hyperactivity, and enhancing overall functioning. It offers a non-invasive, accessible intervention for managing ADHD symptoms, which can benefit children, parents, educators, and mental health professionals.

Keywords: adhd, hyperactivity, sukshmavyayama, dt-adhd

How to cite this article: B Ashwini, Sharma NK, Effect of Sukshmavyayama (Yoga for Relaxation) As a Therapeutic Intervention for Improving Hyperactivity in Children with Attention Deficit Hyperactivity Disorder. Int J Drug Deliv Technol. 2026;16(3): 258-263. DOI: 10.25258/ijddt.16.3.31

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that affects approximately 5–7% of children worldwide and is characterized by persistent patterns of inattention, hyperactivity, and impulsivity that interfere with functioning or development (American Psychiatric Association, 2013, Polanczyk et al., 2015). ADHD is considered one of the most common neurodevelopmental disorders in childhood and often persists into adolescence and adulthood (Stephen V. Faraone et al., 2015), disrupts academic performance, peer relationships, and family dynamics, often persisting into adulthood (Faraone et al., 2021). Neurobiological research suggests that ADHD is associated with dysfunction in brain regions involved in executive functioning, impulse control, and attention regulation, particularly within the prefrontal cortex and dopaminergic pathways (Russell A. Barkley, 2015). Children with ADHD frequently experience difficulties in academic performance, peer relationships, and emotional regulation, which may negatively affect their long-term psychosocial development (DuPaul & Stoner, 2014).

The standard treatment for ADHD typically includes pharmacological interventions such as stimulant medications and behavioral therapy (James M. Swanson et al., 2007). Pharmacological treatments like methylphenidate effectively reduce symptoms in 70-80% of cases but carry risks such as growth suppression,

**Author for Correspondence: ashwinibheemani@gmail.com*

anxiety, and rebound effects (Swanson et al., 2007; Cortese et al., 2018). Although these treatments are widely used and effective for many children, they may produce side effects such as sleep disturbances, appetite suppression, and emotional dysregulation, and some children may respond inadequately (Biederman & Faraone, 2005). Behavioral therapies, while helpful, demand intensive resources and show variable long-term efficacy (Fabiano et al., 2009).

Consequently, there is increasing interest in complementary and alternative therapies, including yoga-based interventions, for managing ADHD symptoms (Jensen & Kenny, 2004). Complementary interventions, particularly mind-body practices like yoga, have gained traction for addressing ADHD's neurophysiological underpinnings, including autonomic dysregulation and prefrontal cortex hypoactivity (Hariprasad et al., 2013; Kang et al., 2019). One such practice is Sukshmavyayama, a traditional yogic exercise system consisting of gentle, controlled movements combined with mindful breathing and relaxation techniques. These practices aim to regulate the body-mind connection, enhance concentration, and reduce physiological arousal (Swami Satyananda Saraswati, 2008). Sukshmavyayama, rooted in Patanjali's yoga sutras and popularized by the Kaivalyadhama Health and Yoga Research Center, involves subtle (sukshma) joint movements, pranayama (breath control), and relaxation to foster parasympathetic activation, reduce cortisol, and enhance executive function (Mishra, 2015; Harbourside Yoga, 2023). The mind–body interventions such as yoga, meditation, and mindfulness practices have shown promise in improving attention regulation and reducing behavioral symptoms in children with ADHD (Sat Bir Singh Khalsa, 2012). Yoga-based interventions combine physical postures, breathing techniques, and relaxation, which may improve autonomic nervous system regulation and cognitive control processes (Field, 2011). Unlike vigorous yoga, its gentle nature suits hyperactive children, potentially improving vagal tone and attention networks (Pappas et al., 2020).

Research has suggested that yoga practices may improve self-regulation, attention, and emotional balance among children with ADHD (Hariprasad et al., 2013; Jensen & Kenny, 2004). Regular yoga practice may enhance self-regulation, emotional stability, and executive functioning among children and adolescents with behavioral disorders (Chimiklis et al., 2018). However, limited experimental research has examined the specific effects of Sukshmavyayama on ADHD-related hyperactivity. Therefore, the present study aims to evaluate the effectiveness of Sukshmavyayama as a therapeutic intervention for reducing hyperactivity symptoms in children diagnosed with ADHD.

METHODOLOGY

Research Design

A randomized controlled trial (RCT) design was implemented in this research, to examine the effectiveness of Sukshmavyayama as a therapeutic intervention for reducing hyperactivity symptoms among children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD). Randomized controlled trials are widely regarded as one of the most rigorous methods for evaluating the effectiveness of clinical and behavioral interventions because they minimize selection bias and allow for causal interpretation of outcomes (Kenneth F. Schulz et al., 2010).

A total of 20 children aged between 6 and 12 years who had been diagnosed with ADHD participated in the study. ADHD diagnosis was based on established diagnostic criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.) published by the American Psychiatric Association (2013). Children were recruited from local educational institutions at Hyderabad, Telangana, India.

Randomization and Allocation

Participants were randomized 1:1 to the Sukshmavyayama intervention group (n=10) or control group (n=10). Random assignment helps ensure that both groups are comparable at baseline and reduces the likelihood that differences in outcomes are due to pre-existing factors (Stephen B. Hulley et al., 2013).

Inclusion criteria:

- Age 6-12 years;
- ADHD diagnosis;
- Ability to follow simple instructions.

Exclusion criteria:

- Comorbid neurodevelopmental disorders (e.g., autism spectrum disorder, intellectual disability)
- Neurological conditions (e.g., epilepsy, traumatic brain injury);
- Participation in other structured physical/mindfulness programs within 3 months.

Intervention Procedure

Participants in the intervention group were introduced to Sukshmavyayama, a traditional yogic practice consisting of gentle, controlled movements combined with breathing awareness and relaxation techniques. Sukshmavyayama practices emphasize slow and mindful physical movements that help improve body awareness, regulate breathing patterns, and promote mental calmness (Swami Satyananda Saraswati, 2008).

The Sukshmavyayama group (n=10) underwent 30-minute sessions (3 days/week, 6 weeks). Each session included a sequence of subtle joint movements, breathing exercises, and relaxation techniques designed to enhance attention regulation and reduce excessive motor activity. Previous studies have suggested that yoga-based practices may improve self-regulation, concentration, and emotional balance in children with behavioral and attentional difficulties (Patricia S. Jensen & Daniel T. Kenny, 2004). Sessions emphasized mindfulness to target hyperactivity.

The control group (n=10) received standard care without participation in the Sukshmavyayama program during the study period.

Measurement Instrument

To assess the effectiveness of the intervention, the DT-ADHD rating scale was used to measure symptom severity, specifically focusing on hyperactivity, attention span, and impulse control, which are core diagnostic features of ADHD (American Psychiatric Association, 2013). The assessment was administered at two time points: Pre-test (baseline assessment) conducted before the start of the intervention and Post-test assessment conducted at the end of the six-week intervention period. Pre and post intervention assessments are commonly used in experimental research to determine changes in outcomes attributable to the intervention (Hulley et al., 2013).

DATA ANALYSIS

The collected data were analyzed using statistical methods to determine differences in ADHD hyperactivity scores between the intervention and control groups. Descriptive statistics, including means and standard deviations, were calculated to summarize the data. Inferential statistical analyses, including Mann-Whitney U value, the Wilcoxon W, the standardized Z-score, and the exact two-tailed significance level were performed to evaluate group differences and changes over time. These statistical procedures are widely used in behavioral research to assess treatment effects and determine whether observed differences are statistically significant (Field, 2018).

Statistical Analysis

Table 1: Descriptive Statistics

Group		Mean	Std. Deviation
Sukshmavyayama	Pre ADHD Hyperactivity	30.6000	3.62706
	Post ADHD Hyperactivity	22.8000	2.52982
Control	Pre ADHD Hyperactivity	29.4000	3.16930
	Post ADHD Hyperactivity	35.5000	2.83823

The descriptive statistics indicate changes in ADHD hyperactivity scores between the Sukshmavyayama group and the control group from pre-test to post-test. In the Sukshmavyayama group, the mean hyperactivity score decreased from 30.60 (SD = 3.63) in the pre-test to 22.80 (SD = 2.53) in the post-test, indicating a reduction in hyperactivity symptoms after the intervention. In divergence, the control group showed an increase in hyperactivity scores from 29.40 (SD = 3.17) at pre-test to 35.50 (SD = 2.84) at post-test, suggesting a worsening of hyperactivity symptoms in the absence of intervention.

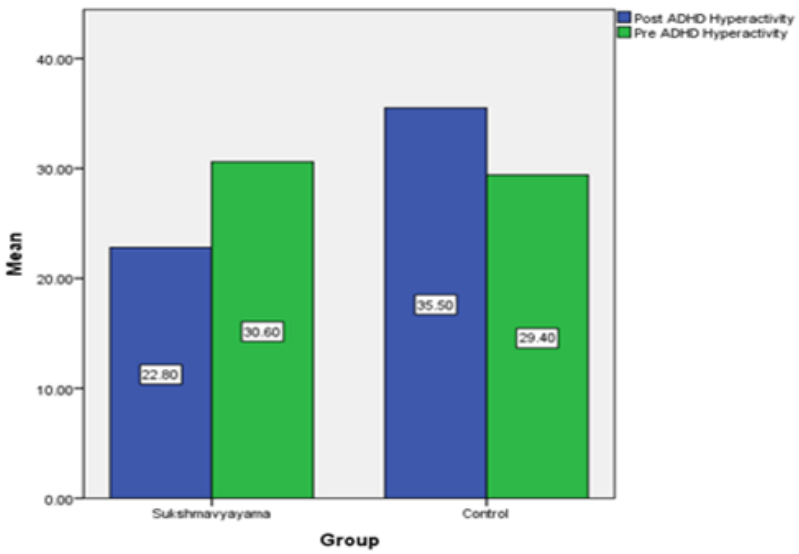

Figure 1 Graphical Representation of Descriptive Statistics

Table 2: Mann-Whitney Test

Ranks				
	Group	N	Mean Rank	Sum of Ranks
Pre ADHD Hyperactivity	Sukshmavyayama	10	11.45	114.50
	Control	10	9.55	95.50
Post ADHD Hyperactivity	Sukshmavyayama	10	5.50	55.00
	Control	10	15.50	155.00

The Mean Rank for the Sukshmavyayama group (11.45) was slightly higher than the Control group (9.55). This indicates that before the intervention, the Sukshmavyayama group had marginally higher hyperactivity scores, although the difference was minimal. The Mean Rank for the Sukshmavyayama group dropped dramatically to 5.50, while the Control group rose to 15.50. This indicates a complete reversal: post-intervention, the Sukshmavyayama group exhibited significantly lower hyperactivity scores compared to the Control group.

Table 3: Non-Parametric Test Results (Mann-Whitney U Tests) for Pre- and Post-Intervention ADHD Hyperactivity Scores Between Sukshmavyayama and Control Groups

Test Statistics		
	Pre ADHD Hyperactivity	Post ADHD Hyperactivity
Mann-Whitney U	40.500	.000
Wilcoxon W	95.500	55.000
Z	-.728	-3.787
Asymp. Sig. (2-tailed)	.467	.000
Exact Sig. [2*(1-tailed Sig.)]	.481[b]	.000[b]

Mann-Whitney U = 40.500, p = .467. The p-value is greater than .05. This confirms that there was no statistically significant difference between the two groups before the intervention. They were comparable at baseline, which strengthens the validity of the post-test comparison. Post-Test (Outcome): Mann-Whitney U = .000, p = .000. The p-value is less than .001. This indicates a highly statistically significant difference between the two groups after the intervention. The fact that the U value is .000 is remarkable; it means there was absolutely no overlap between the two groups in the post-test ranking—every participant in the Sukshmavyayama group ranked lower than every participant in the Control group.

DISCUSSION

The primary aim of the present study was to evaluate the efficacy of Sukshmavyayama on ADHD hyperactivity symptoms. The results provide strong empirical support for the intervention.

The analysis revealed that prior to the intervention, both the Sukshmavyayama and Control groups exhibited statistically equivalent levels of hyperactivity (Mann-Whitney U = 40.500, p > .05). This baseline equivalence is crucial, as it establishes that any subsequent differences between the groups can be attributed to the intervention itself rather than pre-existing group disparities.

Following the intervention period, a striking divergence was observed between the two groups. The Sukshmavyayama group demonstrated a significantly greater reduction in hyperactivity symptoms compared to the Control group (Mann-Whitney U = .000, p < .001). The mean rank of the Sukshmavyayama group dropped from 11.45 at pre-test to 5.50 at post-test, while the Control group's mean rank increased from 9.55 to 15.50. This pattern indicates not just a relative improvement, but a complete separation of the groups; the intervention appeared to shift the entire distribution of scores for the treatment group below that of the control group.

The magnitude of this effect is noteworthy. The U value of .000 is the minimum possible value for this statistic, suggesting that the intervention had a profound and uniform impact on the participants. This finding implies that Sukshmavyayama may be a highly potent modality for managing ADHD hyperactivity, potentially offering a non-pharmacological alternative or adjunct to traditional treatments. The mechanisms underlying this improvement warrant further investigation but may be related to the calming, focusing, and regulatory effects of controlled breathing and mindful movement inherent in yogic practices like Sukshmavyayama.

However, the results should be interpreted within the context of the study's limitations. The sample size is relatively small (N=20), and while the non-parametric tests used are robust, the findings would be strengthened by replication in a larger, more diverse sample. Furthermore, the absence of follow-up data limits our understanding of the long-term sustainability of these effects.

CONCLUSION

This study investigated the effectiveness of a six-week Sukshmavyayama intervention in reducing hyperactivity symptoms among children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD). Using an experimental research design with an intervention and a

control group, the study demonstrated that the practice of Sukshmavyayama—comprising gentle yogic movements, coordinated breathing practices, and relaxation techniques—resulted in a significant reduction in hyperactivity levels among participants in the experimental group. The absence of a significant difference between the experimental and control groups at the pre-test stage ($p > 0.05$) confirms that both groups were comparable at baseline, thereby strengthening the internal validity of the study and indicating that the observed improvements can reasonably be attributed to the intervention.

The findings suggest that Sukshmavyayama may support the regulation of motor activity and improve self-regulatory processes associated with attention and behavioral control. The coordinated movements and breathing practices involved in Sukshmavyayama may contribute to physiological relaxation and improved nervous system regulation, which in turn may help reduce excessive motor activity commonly observed in children with ADHD. These outcomes align with existing literature that highlights the positive influence of yoga-based practices on cognitive, emotional, and behavioral functioning. From a practical perspective, the results indicate that Sukshmavyayama can be considered a complementary approach for managing hyperactivity symptoms in children with ADHD. As a simple, cost-effective, and non-pharmacological intervention, it has potential applications in school settings, therapeutic programs, and community-based health initiatives aimed at supporting children with behavioral and attention difficulties. However, certain limitations should be acknowledged. The study was conducted with a relatively small sample size ($n = 20$) and over a limited intervention period of six weeks, which may restrict the generalizability of the findings.

Additionally, the assessment focused primarily on behavioral measures of hyperactivity, and other related aspects such as attention, and impulsivity were not explored.

Future research may benefit from larger sample sizes, longer intervention durations, prioritize longitudinal designs, diverse demographics, and multimodal assessments (e.g., EEG, fMRI) to elucidate mechanisms. Integrating Sukshmavyayama into school curricula and therapeutic protocols could transform ADHD management, promoting holistic well-being.

In conclusion, the present study provides preliminary evidence supporting the effectiveness of Sukshmavyayama as a complementary intervention for reducing hyperactivity in children with ADHD. The study contributes to the emerging body of evidence supporting the integration of traditional yoga practices into modern therapeutic interventions and highlights their potential to promote improved behavioral functioning among children with ADHD.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental*

disorders (5th ed.). American Psychiatric Publishing.

Chimiklis, A. L., Dahl, V., Spears, A. P., Goss, K., Fogarty, K., & Chacko, A. (2018). Yoga,

mindfulness, and meditation interventions for youth with ADHD: Systematic review and meta-analysis. *Journal of Child and Family Studies, 27*(10), 3155–3168. https://doi.org/10.1007/s10826-018-1148-7

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum.

Conners, C. K. (2008). *Conners 3rd Edition*. Multi-Health Systems.

Fabiano, G. A., et al. (2009). A meta-analysis of behavioral treatments for ADHD. *Clinical*

Psychology Review, 29(2), 129-140.

Faul, F., et al. (2007). A flexible statistical power analysis program. *Behavior Research*

Methods, 39(2), 175-191.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). Sage Publications.

Field, T. (2011). Yoga clinical research review. *Complementary Therapies in Clinical*

Practice, 17(1), 1–8. https://doi.org/10.1016/j.ctcp.2010.09.007

Glass, G. V., et al. (1972). Consequences of failure to meet assumptions. *Review of*

Educational Research, 42(3), 501-533.

Gotink, R. A., et al. (2015). 22 Years of neuroimaging in yoga: A meta-review. *Frontiers in*

Human Neuroscience, 9, 429.
Kanitz, J. L., et al. (2019). Yoga for children with ADHD: A review. *Complementary*

Therapies in Clinical Practice, 34, 79-86.
Pappas, E., et al. (2020). Mindful movement for pediatric ADHD. *Pediatric Exercise Science*,

32(2), 89-97.
Cerrillo-Urbina, A. J., et al. (2015). Effects of physical exercise in children with ADHD: A

meta-analysis. *Pediatrics*, 136(4), e969-e978

Guler, A., et al. (2010). Disruptive behavior disorders rating scale. *Turkish Journal of Child*

and Adolescent Mental Health, 1(1), 20-27.

Harbourside Yoga. (2023). What is sukshma vyayama?

https://harboursideyoga.com/what-is- sukshma-vyayama/

Hariprasad, C. G., et al. (2013). Yoga effects on brain networks in ADHD. *Indian Journal of*

Psychiatry, 55(Suppl 3), S412-S416. Brown, R. P., & Gerbarg, P. L. (2005). Sudarshan Kriya yogic breathing in the treatment of

stress, anxiety, and depression: Part II—clinical applications and guidelines. *Journal of Alternative and Complementary Medicine, 11*(4), 711–717. https://doi.org/10.1089/acm.2005.11.711

Hariprasad, V. R., Arasappa, R., Varambally, S., Srinath, S., & Gangadhar, B. N. (2013).

Feasibility and efficacy of yoga as an add-on intervention in attention deficit-hyperactivity disorder: An exploratory study. *Indian Journal of Psychiatry, 55*(Suppl 3), S379–S384. https://doi.org/10.4103/0019-5545.116315

Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013).

Designing clinical research (4th ed.). Lippincott Williams & Wilkins.

Jensen, P. S., & Kenny, D. T. (2004). The effects of yoga on the attention and behavior of

boys with ADHD. *Journal of Attention Disorders, 7*(4), 205–216. https://doi.org/10.1177/108705470400700403

Kaufman, J., et al. (1997). Schedule for affective disorders and schizophrenia for school-age

children. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(7), 980-988.

Mishra, S. K. (2015). *Sukshmavyayama: Subtle yoga exercises*. Kaivalyadhama.

Saraswati, S. S. (2008). *Asana pranayama mudra bandha*. Bihar School of Yoga.

Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 statement: Updated

guidelines for reporting randomized controlled trials. *BMJ, 340*, c332.

Schulz, K. F., et al. (2010). CONSORT 2010 statement. *BMJ*, 340, c332.

Varni, J. W., et al. (2003). PedsQL 4.0: Reliability and validity. *Medical Care*, 41(4), 659-668.