
**COMPARATIVE EFFECT OF FOOT REFLEXOLOGY AND SUPER
BRAIN YOGA ON ATTENTION AND FUNCTIONAL OUTCOMES IN
CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY
DISORDER: A QUASI-EXPERIMENTAL STUDY**

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Abstract

Background: Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition characterized by developmentally inappropriate inattention, hyperactivity and impulsivity, with consequences for learning, social participation and family functioning. Pharmacological and behavioural therapies remain central to management, but the chronic and heterogeneous nature of ADHD has encouraged interest in complementary, sustainable and family-centred approaches. This study examined two integrative interventions - foot reflexology and Super Brain Yoga (SBY) - as adjunctive approaches for children with ADHD.

Methods: A quasi-experimental, three-group pretest-posttest design was used. Children aged 6-16 years with a confirmed ADHD diagnosis were recruited through non-probability purposive sampling. Of 143 children initially recruited, 138 completed the study and were included in analysis: 46 in a standard-care control group, 46 in a foot reflexology group and 46 in an SBY group. Foot reflexology consisted of six alternate-day sessions over two weeks using a validated protocol; SBY was performed twice daily for four weeks using a validated protocol. Outcomes were measured using the Vanderbilt parent follow-up assessment scale, with attention, motor activity, academic performance and combined ADHD scores assessed before and after intervention.

Results: Pre-intervention scores were broadly comparable across the three groups. Post-intervention mean attention scores were 16.41 $\pm$ 5.22 in the control group, 13.39 $\pm$ 4.79 in the foot reflexology group and 14.39 $\pm$ 3.68 in the SBY group; one-way ANOVA showed a significant group difference ($F=5.12$, $p<0.05$). Combined ADHD scores declined from 28.88

to 28.34 in controls, 26.34 to 23.78 in the foot reflexology group and 28.05 to 24.42 in the SBY group. The source study reported a significant post-intervention difference in combined ADHD scores, with post-hoc analysis indicating the clearest benefit for foot reflexology. Significant between-group differences were not demonstrated for motor activity or academic performance. Participants and caregivers expressed strong acceptance of both interventions.

Conclusion: Foot reflexology demonstrated a significant beneficial effect on attention and combined ADHD scores, while SBY showed a favourable but less pronounced trend. These approaches may be considered complementary to standard ADHD care, but larger randomized studies with longer follow-up are needed.

Keywords: ADHD; children; foot reflexology; Super Brain Yoga; integrative nursing; attention; complementary intervention.

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity and impulsivity that are developmentally inappropriate and interfere with functioning. Its effects extend beyond the core symptoms. Children may experience impaired executive functioning, working memory limitations, emotional dysregulation, pragmatic language difficulties, strained peer and teacher relationships, academic underachievement and reduced participation in age-appropriate activities. The source study notes that ADHD is heterogeneous and may persist into adulthood, increasing the risk of educational, occupational and psychosocial difficulties. This complexity makes management a long-term process rather than a short episode of treatment.

Conventional management commonly combines stimulant or non-stimulant medication with behavioural interventions. Although medication can reduce symptoms, responses vary, adverse effects may occur, and families may have concerns about prolonged pharmacological treatment. Consequently, non-pharmacological and complementary strategies have attracted interest as adjuncts rather than replacements for evidence-based care. Integrative approaches described in the study include neurofeedback, massage and other body therapies, reflexology, mindfulness, physical activity and yoga-based techniques. Their appeal includes accessibility, potential sustainability and the possibility of active family participation; however, the evidence base remains uneven and requires careful evaluation.

Foot reflexology applies pressure to specific areas of the feet and has been explored for effects on relaxation, autonomic regulation and attention. The study cites preliminary evidence suggesting that foot massage or reflexology may improve selected ADHD symptoms. Super Brain Yoga (SBY) is a simple exercise combining squatting, cross-body positioning, earlobe holding and coordinated breathing. Prior studies summarized in the study suggest that yoga-based practices may have favourable effects on attention and selected behavioural outcomes, although findings are not conclusive. Importantly, the study frames both interventions as complementary to standard treatment and as potential tools for integrative nursing and family-centred care.

The study investigated integrative interventions on motor activity, attention and academic performance among children with ADHD. The present study focuses on comparing the effects of foot reflexology and SBY with standard care on attention, motor activity, academic performance and combined ADHD scores in children aged 6-16 years.

METHODOLOGY

A quantitative quasi-experimental, three-group pretest-posttest design was adopted. The study

population comprised children aged 6-16 years with ADHD diagnosed and confirmed by a psychiatrist or paediatrician. Children were recruited using non-probability purposive sampling and entered the control, foot reflexology or SBY group according to preference and convenience, as described in the source study. The calculated final sample size was 138 after allowing for attrition. A total of 143 children were initially recruited; following incomplete data and dropouts, 46 participants in each group completed the study and were included in analysis.

The control group continued standard care, defined in the source as prescribed stimulant or non-stimulant medication with or without counselling or behavioural therapy. The foot reflexology group received six sessions administered on alternate days over two weeks using a validated protocol specifically developed for children with ADHD. The SBY group practiced the validated SBY protocol twice daily for four weeks. SBY involved coordinated squatting, cross-midline hand placement/earlobe holding and breathing. The interventions were delivered as adjuncts and were not intended to replace ongoing standard treatment.

The Vanderbilt ADHD follow-up parent assessment scale was used to obtain pre- and post-intervention scores. Outcomes included attention (questions 1-9), motor activity (questions 10-18), academic performance (questions 19-22) and a combined ADHD score. This study also used structured tools to assess demographic and clinical profiles, risk factors and behavioural impairments. Validity and standardization procedures for the intervention protocols and study tools were undertaken before the main study, and a pilot study preceded data collection.

Descriptive statistics included frequency, percentage, mean and standard deviation. One-way analysis of variance was used for between-group comparison of outcome scores, with Tukey's HSD applied for relevant post-hoc comparisons. Paired analysis was used for within-group pre-post comparison as reported in the study. Statistical significance was set at $p < 0.05$. Ethical approvals and administrative permissions were obtained before data collection. Written informed consent was obtained from parents and assent from children older than seven years. Participation was voluntary, withdrawal was permitted, and privacy, confidentiality and anonymity were protected.

RESULTS

The final analysis included 138 children, with 46 participants in each of the three groups. The source study reported that most children were in the 6-10-year age range and that boys predominated. Learning disability was the most frequently reported comorbid condition, affecting approximately 23.91%-28.26% across groups. Other descriptive findings included a positive family history of ADHD in roughly 28%-30% of participants, increased screen time in 45.65%-60.86%, and frequent consumption of junk food in 39.13%-52.17%. Behavioural impairment was prominent in cognitive, academic and social domains. These background findings illustrate the multidimensional difficulties experienced by the study population.

Table 1. Pre- and post-intervention outcome scores across the three groups

Outcome	Control Pre	Control Post	Reflexology Pre	Reflexology Post	SBY Pre	SBY Post
Attention	16.52+/- 5.23	16.41+/- 5.22	15.76+/- 5.17	13.39+/- 4.79	17.02+/- 3.49	14.39+/- 3.68
Motor activity	9.17+/- 7.04	8.72+/- 7.05	7.54+/-5.65	7.35+/-5.05	7.74+/- 6.47	6.74+/- 5.83
Academic performance	3.19+/- 0.72	3.21+/- 0.68	3.04+/-0.62	3.04+/-0.56	3.29+/- 0.54	3.29+/- 0.55

Combined ADHD	28.88+/- 9.16	28.34+/- 9.86	26.34+/- 9.13	23.78+/- 8.68	28.05+/- 9.09	24.42+/- 8.50
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At baseline, the three groups were comparable with respect to attention. Following intervention, attention scores improved more clearly in the intervention groups. Post-intervention mean attention was 16.41 in controls, 13.39 in the foot reflexology group and 14.39 in the SBY group. One-way ANOVA yielded $F=5.122$, $p<0.05$, demonstrating a significant difference among groups.

Table 2. Key post-intervention comparisons

Outcome	Control	Foot Reflexology	SBY	Interpretation
Attention mean	16.41	13.39	14.39	Significant group difference; $F=5.122$, $p<0.05$
Combined ADHD mean	28.34	23.78	24.42	Significant group difference reported; reflexology showed clearest benefit
Motor activity mean	8.72	7.35	6.74	No significant post-intervention group difference reported
Academic performance mean	3.21	3.04	3.29	No significant post-intervention group difference reported

Combined ADHD scores also showed favourable change. Mean scores decreased from 28.88 to 28.34 in controls, from 26.34 to 23.78 after foot reflexology, and from 28.05 to 24.42 after SBY. The study reports a statistically significant post-intervention difference among the three groups and indicates through Tukey's HSD that foot reflexology was effective in improving combined ADHD scores. Although SBY did not show the same statistically distinct between-group effect, its reduction in combined score suggested a favourable trend. Within-group analysis further supported significant improvement after foot reflexology; the study also describes a positive impact of SBY, while standard care alone did not produce a significant pre-post change in the combined outcome.

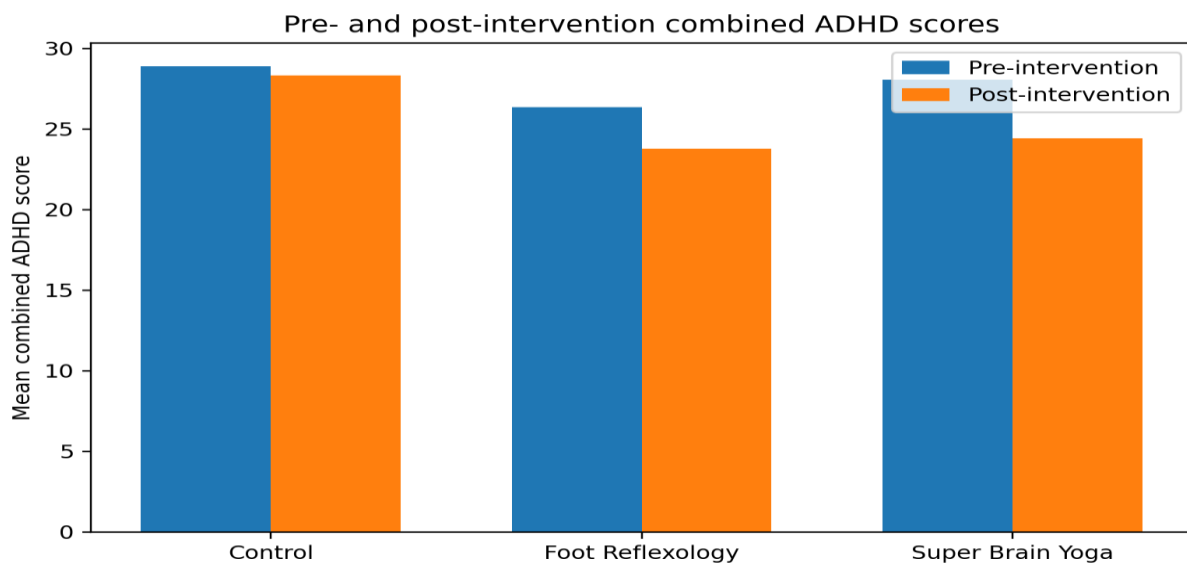


Figure 1. Pre- and post-intervention mean combined ADHD scores.

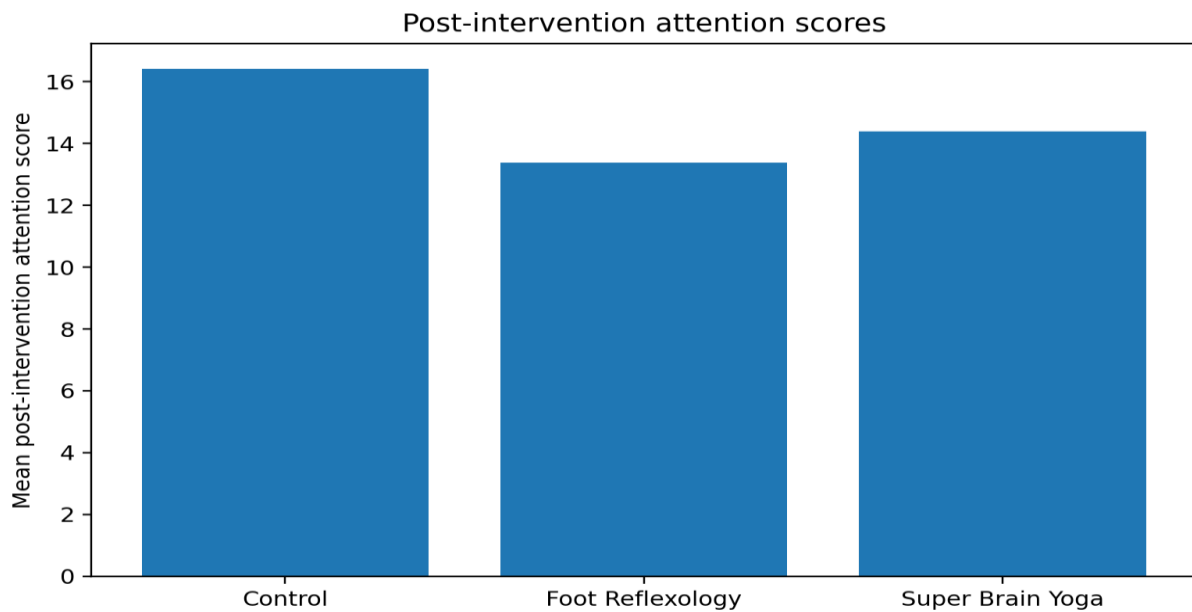


Figure 2. Post-intervention mean attention scores across study groups.

Motor activity decreased numerically in both intervention groups, particularly SBY, but the study did not demonstrate a statistically significant post-intervention difference among the groups. Academic performance scores changed very little, and no significant group difference was reported. Thus, the strongest evidence concerned attention and the combined ADHD outcome rather than all individual domains. Acceptability was high: the study reports unanimous willingness among respondents to continue the interventions and recommend them to others, supporting feasibility and family acceptance as adjunctive strategies.

DISCUSSION

This study compared two integrative interventions with standard care for children with ADHD and found the clearest benefit for foot reflexology. The significant post-intervention difference in attention scores, together with post-hoc findings favouring reflexology, suggests that a short, structured reflexology protocol may help reduce parent-rated attention-related symptoms. Combined ADHD scores also improved more in the intervention groups than in controls, with the source study again identifying foot reflexology as the more pronounced effect. SBY produced a favourable reduction in attention and combined scores, but its between-group effect was less definitive.

The findings are broadly consistent with literature reviewed in the study. A randomized study of foot massage among children aged 6-12 years reported significant improvements in memory/attention deficit and total ADHD symptom severity. The study also cites a reflexotherapy case report describing improvement in focus and hyperactivity. Proposed explanations include relaxation and modulation of autonomic activity, although mechanisms remain uncertain and should not be overstated. For yoga-based approaches, previous research has reported modest improvements in objective attention and selected parent-rated behaviours. Such findings support further investigation of structured movement and breathing practices while acknowledging the need for stronger trials.

The absence of significant between-group differences for motor activity and academic performance is important. It indicates that integrative interventions should not be presented as

universally effective across all ADHD-related functional domains. Academic outcomes are influenced by multiple factors, including learning disorders, school support, cognitive functioning, medication, family environment and duration of intervention. Similarly, motor activity may require longer exposure or more targeted behavioural and physical interventions. The findings therefore support a complementary, individualized approach rather than replacement of established pharmacological, behavioural or educational management.

From a nursing perspective, the study is relevant to integrative and developmental care. Nurses can contribute to screening, parent education, adherence support, monitoring and coordination of non-pharmacological strategies when these are safe, acceptable and used alongside evidence-based treatment. The high acceptability reported by families strengthens the case for further evaluation. Limitations include purposive sampling, participant preference in group allocation, reliance on parent-rated outcomes, unequal intervention durations and the absence of long-term follow-up. Future randomized multicentre studies should use blinded outcome assessment, standardized co-interventions, longer follow-up and objective measures of attention and academic functioning.

CONCLUSION

Foot reflexology and Super Brain Yoga showed potential as complementary interventions for children with ADHD. Foot reflexology produced the strongest evidence of benefit, with significant improvement in attention and combined ADHD outcomes. SBY demonstrated favourable trends but less definitive between-group effects. Neither intervention showed a significant advantage for all measured domains, particularly motor activity and academic performance. These findings support cautious integration of acceptable, low-cost complementary strategies alongside standard ADHD care and justify larger, methodologically rigorous trials.

ETHICAL CONSIDERATIONS

Ethical and administrative approvals were obtained before the study. Written informed consent was obtained from parents and assent from eligible children. Participation was voluntary, confidentiality and anonymity were protected, and participants retained the right to withdraw.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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