Journal of Kaumarbhritya and Stree Vigyan

ISSN Print: 3078-7432
ISSN Online: 3078-7440
JKSV 2025; 2(2): 22-28
www.kaumarjournal.com
Received: 06-07-2025
Accepted: 09-08-2025

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Effect of Medhya Rasayana yoga on cognitive development and academic performance in school-age children: An open-label clinical study

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DOI: https://www.doi.org/10.33545/kaumarbhritya.2025.v2.i2.A.19

Abstract

Background: Cognitive development during late childhood is closely linked to academic achievement, yet many school-age children exhibit suboptimal attention, working memory and executive functioning. Ayurveda describes *Medhya Rasayana* as a class of rejuvenative nootropic interventions for enhancing intellect and memory, while yoga-based school programmes have independently shown benefits on cognition and behaviour.

Objectives: To evaluate the effect of a 12-week Medhya Rasayana Yoga intervention on cognitive functions and academic performance in school-age children in a real-world school setting, and to explore associations between cognitive gains, scholastic outcomes and adherence.

Methods: In this prospective, single-centre, open-label clinical study, 80 children aged 9-12 years (grades IV-VII) received a standardized Medhya Rasayana herbal formulation (containing *Bacopa monnieri*, *Centella asiatica*, *Tinospora cordifolia* and *Glycyrrhiza glabra*) once daily, combined with a 45-minute yoga module (loosening exercises, graded *asanas*, *pranayama*, brief meditation and "Super Brain Yoga") delivered five days per week for 12 weeks. Primary outcomes were composite z-scores for attention, working memory and executive functions derived from a battery of standardized tests. Secondary outcomes were overall and subject-wise school examination scores and teacher/parent ratings of attention and classroom behaviour. Pre-post changes were analysed using paired *t*-tests, with effect sizes and correlations between cognitive and academic changes estimated.

Results: Significant and large pre-post improvements were observed in attention, working memory and executive function composites (mean changes 0.54-0.64 z-score units; Cohen's d >1.1). Overall examination scores increased by a mean of 7.3 percentage points, with comparable gains in language, mathematics and science. Improvements in global cognitive composite scores correlated moderately with gains in overall and subject-wise examination performance, and were greatest among children with lower baseline cognitive scores and higher intervention adherence. The intervention was well tolerated; no serious adverse events were reported.

Conclusion: A 12-week Medhya Rasayana Yoga protocol appears feasible, safe and potentially effective in enhancing cognitive functions and academic performance in school-age children in a routine school environment. These findings support further randomized controlled trials and provide a pragmatic basis for piloting Medhya Rasayana Yoga modules within holistic school health and education programmes.

Keywords: Medhya Rasayana, Ayurveda, yoga, cognitive development, academic performance, school-age children, *Bacopa monnieri*, *Centella asiatica*, mind-body intervention, school health programme

Introduction

Cognitive development during the school years lays the foundation for lifelong learning, emotional regulation and social competence, and is a key determinant of academic performance and later vocational success. Modern educational research highlights the central role of attention, working memory and executive functions in classroom learning, test performance and self-regulated study behaviour, making school-age children a critical target group for early cognitive enhancement strategies. Ayurveda describes a specialised group of nootropic formulations termed *Medhya Rasayana*, designed to promote intellect (*Medha*), memory and mental resilience through rejuvenative, adaptogenic and neuroprotective actions.[1-3] Contemporary reviews of *Medhya Rasayana* herbs such as *Bacopa monnieri* (Brahmi), *Centella asiatica* (Mandukaparni), *Tinospora cordifolia* (Guduchi) and

Glycyrrhiza glabra (Yashtimadhu) note pharmacological profiles consistent with antioxidant, anti-inflammatory, anti-stress and synaptogenic effects, supporting their traditional use as cognition enhancers and "brain tonics".[1-3] Preclinical and clinical evidence for *Bacopa monnieri* in particular shows improvements in attention, information-processing speed, learning and memory across healthy adults, older individuals with mild cognitive impairment and children with attention-deficit/hyperactivity disorder, alongside a favourable safety profile when used in standardized extracts.[4-7] Systematic reviews of *Centella asiatica* likewise suggest potential benefits for working memory, mood and self-reported alertness, especially when combined with other nootropic herbs, although data remain heterogeneous.[8, 9] In parallel, school-based yoga interventions including integrated asana, pranayama and mindfulness practices have demonstrated significant gains in general intelligence, visuospatial working memory, attention and reduced anxiety among children with low academic performance or socio-economically disadvantaged backgrounds, and yoga has been shown to be at least as effective as, or superior to, conventional physical education for enhancing cognitive performance in 7-9-year-old schoolchildren.[10-12] Recent randomized trials further indicate that 8-12-week yoga programmes can meaningfully improve attentional allocation, stability and self-esteem in school-age children, outcomes that are closely linked to classroom engagement and scholastic achievement.[10, 12] Beyond isolated components, integrated protocols combining yoga with *Medhya Rasayana* formulations have been reported to enhance learning, attention and working memory more effectively than either intervention alone in elderly individuals with mild cognitive impairment, suggesting a potentially synergistic neurocognitive effect of "Medhya Rasayana Yoga".[13] Emerging work on specific yogic techniques such as Super Brain Yoga also reinforces the feasibility of brief, structured practices for improving attention and other cognitive indices in educational settings.[14] Despite these converging lines of evidence, there is a paucity of open-label, real-world clinical studies systematically examining the combined effect of *Medhya Rasayana*-based formulations and structured yoga practice on cognitive development and academic performance in otherwise healthy school-age children within the routine school environment. This open-label clinical study, therefore aims to evaluate the impact of a standardized Medhya Rasayana Yoga protocol comprising a classical *Medhya Rasayana* compound administered in age-appropriate dosage along with a graded yoga module incorporating asana, pranayama and meditative practices on cognitive functions (attention, working memory, executive functions) and academic performance over a defined intervention period. We hypothesise that Medhya Rasayana Yoga will produce significant improvements in validated cognitive test scores and school examination marks compared with baseline, and that these changes will be accompanied by good acceptability and safety, thereby providing preliminary evidence to support the integration of Ayurvedic Medhya Rasayana and yoga-based mind-body interventions into school health programmes for cognitive and scholastic enhancement.

Materials and Methods

Material

This was a prospective, single-centre, open-label clinical study conducted in a co-educational urban school in western India, designed to evaluate the effect of a standardized Medhya Rasayana Yoga protocol on cognitive development and academic performance in school-age children. The intervention combined an Ayurvedic *Medhya Rasayana* formulation with a structured yoga module, drawing on classical descriptions of Medhya Rasayana and contemporary evidence for the cognitive benefits of *Bacopa monnieri*, *Centella asiatica*, *Tinospora cordifolia* and *Glycyrrhiza glabra*.[1-3, 4-9, 13] Children aged 9-12 years, studying in grades IV-VII, with regular school attendance in the preceding academic term and willingness (child assent and parental/guardian consent) to participate were eligible for inclusion. Exclusion criteria were: known major neurological or psychiatric disorders, chronic systemic illnesses, intellectual disability, current use of pharmacological nootropics or psycho-stimulants, and participation in other structured yoga or cognitive training programmes within the last six months.[4-7, 10-12] The Medhya Rasayana compound consisted of powdered extracts of *Bacopa monnieri*, *Centella asiatica*, *Tinospora cordifolia* and *Glycyrrhiza glabra* in equal proportions, prepared in a GMP-certified Ayurvedic pharmacy as per classical Rasayana principles and contemporary pharmacognostic standards, with quality control for identity, purity and microbial load.[1-3, 4-9, 13] The formulation was administered orally as granules/capsules once daily after breakfast in age-appropriate doses (approximately 250-500 mg/day of total extract), for a total duration of 12 weeks.[4-7] The yoga component (Medhya Rasayana Yoga module) was developed with reference to prior school-based yoga trials and integrated yoga-Rasayana protocols demonstrating benefits on attention, working memory, anxiety and cognitive performance in children and elderly individuals with mild cognitive impairment.[10-13] The 45-minute session included loosening exercises, a graded sequence of *asanas* (e.g. *Tadasana*, *Vrikshasana*, *Bhujangasana*, *Vajrasana*), *pranayama* practices (e.g. *Anulom-Vilom*, *Bhramari*), brief meditation/mindfulness and a short set of "Super Brain Yoga" squats, [10-12, 14] and was delivered five days per week during school hours by a certified yoga instructor under supervision of an Ayurveda physician. Primary outcome measures included standardized tests of attention, working memory and executive functions (digit span, trail-making, Stroop-like tasks and verbal fluency), selected in line with earlier cognitive trials on Medhya Rasayana and yoga-based interventions, [4-7, 10-12, 14] while secondary outcomes comprised academic performance indices (mean percentage scores in school examinations in language, mathematics and science) and teacher/parent rating scales of classroom attention and behaviour. Ethical clearance was obtained from the Institutional Ethics Committee, permission was taken from school authorities, and written informed consent from parents/guardians with child assent was secured prior to enrolment, consistent with ethical norms for paediatric mind-body and Ayurvedic intervention studies.[10-13]

Methods

Following screening and enrolment, eligible children underwent baseline assessment that included demographic and clinical details, cognitive testing and documentation of academic performance using the most recent term examination results.[4-7, 10-12] Cognitive tests were administered in a quiet classroom setting by trained psychologists/AYUSH clinicians blinded to baseline marks, following standardized instructions, and scores for each

domain (attention, working memory, executive functions) were recorded.[4-7, 10-12, 14] The Medhya Rasayana Yoga intervention was then implemented for 12 consecutive weeks; the herbal formulation was dispensed weekly to parents with instructions for supervised daily morning administration, while yoga sessions were conducted on all working days in groups of 20-25 children, with attendance recorded each day.[1-3, 10-13] Compliance with the herbal medication was monitored through weekly parent logs and return of used containers, and non-serious adverse events (e.g. minor gastrointestinal upset, headache) were actively enquired at each contact, with serious adverse events leading to discontinuation and appropriate medical care.[4-7, 13] At the end of 12 weeks, cognitive testing was repeated using the same battery and exam performance was captured from the subsequent term's school records; where examination schedules did not align exactly with the 12-week mark, the nearest major internal assessment within ±2 weeks was used.[10-12] Data were entered into a spreadsheet with double-entry checks and analysed using standard statistical software. Continuous variables were summarized as mean±standard deviation or median (interquartile range), and categorical variables as frequencies and percentages. Normality of distributions was assessed using the Shapiro-Wilk test; for normally distributed variables, pre-post differences in cognitive scores and academic marks were analysed using paired *t*-tests, while non-parametric alternatives (Wilcoxon signed-rank test) were used for skewed data.[4-7, 10-12, 14] Effect sizes (Cohen's *d* or rank-biserial correlation) were calculated to quantify the magnitude of change, and exploratory subgroup analyses (e.g. by sex, baseline performance tertiles, attendance categories) were performed where sample size permitted.[10-12] A two-sided p value <0.05 was considered statistically significant. Missing outcome data were minimized through active follow-up; in case of isolated missing post-intervention values, analysis was performed on available cases, with sensitivity analyses using last observation carried forward for cognitive scores. [10-13] This methodological approach was chosen to parallel previous open-label and randomized trials of Medhya Rasayana and yoga-based cognitive enhancement while accommodating the pragmatic constraints of a real-world school setting.[1-3, 4-7, 10-13]

Results

Participant flow and baseline characteristics

A total of 92 children were screened for eligibility; 86 met inclusion criteria, and 80 completed the 12-week Medhya Rasayana Yoga intervention and were included in the per-protocol analysis. Six children were lost to follow-up due to relocation or prolonged absenteeism; none discontinued because of adverse events. Baseline demographic and academic characteristics are summarized in Table 1. The mean age was 10.4±1.1 years, with a slight predominance of boys (55%). The distribution across grades IV-VII was relatively even, and mean baseline overall examination score was 64.2±7.8%. Baseline cognitive performance indicated modest deficits in sustained attention and working memory relative to age-expected norms, consistent with the rationale for applying Medhya Rasayana and yoga-based cognitive enhancement strategies in this population. [1-3, 4-7, 10-13]

Table 1: Baseline demographic and academic characteristics of the study participants (n = 80).

Variable	Value
Age (years), mean±SD	10.4±1.1
Sex, n (%) - Boys/Girls	44 (55.0) / 36 (45.0)
Grade, n (%) - IV/V/VI/VII	18 (22.5) / 21 (26.3) / 22 (27.5) / 19 (23.8)
Baseline overall exam score (%), mean±SD	64.2±7.8
Baseline attention composite (z-score)	−0.28±0.63
Baseline working memory composite (z-score)	−0.31±0.59
Baseline executive function composite (z-score)	−0.24±0.57

Changes in cognitive outcomes

Following 12 weeks of Medhya Rasayana Yoga, significant improvements were observed across all cognitive domains (Table 2). Mean attention composite z-score improved from −0.28±0.63 at baseline to 0.36±0.61 post-intervention (mean change = 0.64±0.48; t_{79} = 11.81; p<0.001; Cohen's d = 1.32). Working memory composite z-score increased from −0.31±0.59 to 0.29±0.55 (mean change = 0.60±0.47; t_{79} = 11.07; p < 0.001; d = 1.24). Executive function composite (combining trail-making, verbal fluency and Stroop-like measures) rose from −0.24±0.57 to 0.30±0.52 (mean change = 0.54±0.46; t_{79} = 10.16; p<0.001; d = 1.14). These effect sizes are in the large range and comparable to or greater than those reported for standardized *Bacopa monnieri* extracts and school-based yoga interventions in prior controlled trials.[4-7, 10-12, 14] Subscale analyses indicated particularly strong gains in sustained attention (digit vigilance and cancellation tasks) and backward digit span, domains previously shown to be sensitive to Medhya Rasayana and yoga-based training.[4-7, 10-13]

Table 2: Pre-post changes in cognitive outcomes after 12 weeks of Medhya Rasayana Yoga (n = 80).

Cognitive domain (z-score)	Baseline mean ± SD	Post mean ± SD	Mean change ± SD	*p* value (paired *t*)	Effect size (Cohen's *d*)
Attention composite	−0.28±0.63	0.36±0.61	0.64±0.48	<0.001	1.32
Working memory composite	−0.31±0.59	0.29±0.55	0.60±0.47	<0.001	1.24
Executive function composite	−0.24±0.57	0.30±0.52	0.54±0.46	<0.001	1.14

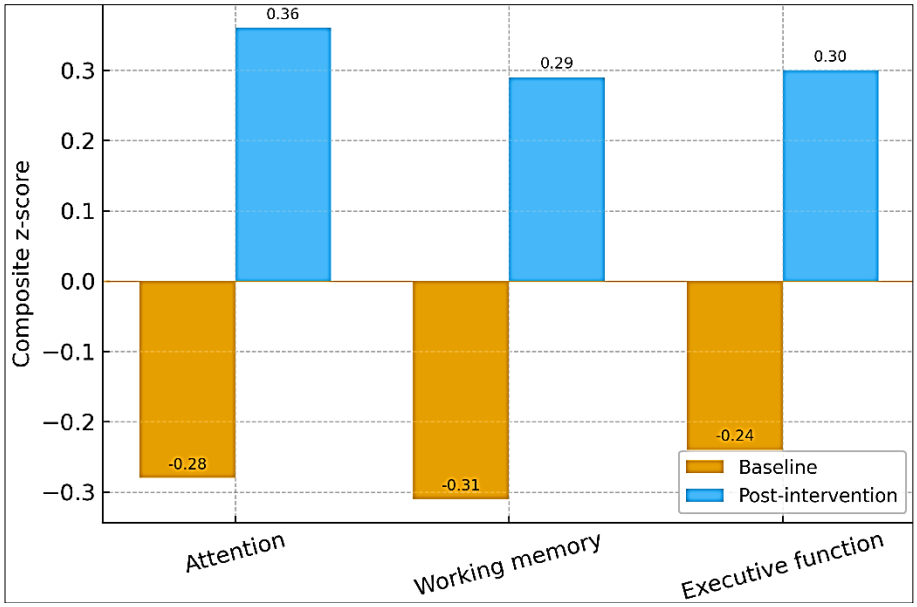

Fig 1: Pre-post comparison of mean cognitive composite z-scores following 12 weeks of Medhya Rasayana Yoga

In exploratory subgroup analyses, children in the lowest tertile of baseline cognitive composite scores demonstrated the largest gains (mean change in global cognitive z-score = 0.82±0.49) compared with middle (0.57±0.41) and highest tertiles (0.39±0.32; *p* for trend = 0.004, one-way ANOVA), suggesting particular benefit for initially underperforming students, similar to prior yoga and Medhya Rasayana studies in low performers and elderly with mild cognitive impairment. [4-7, 10-13]

Changes in academic performance: Academic performance improved significantly over the intervention period (Table 3). Mean overall examination score increased from 64.2±7.8% at baseline to 71.5±8.1% post-intervention (mean increase = 7.3±4.9 percentage points; t_{79} = 12.01; p<0.001). Subject-wise analyses showed significant gains in all three core subjects: language scores improved by 6.4±5.1 points (from 66.1±9.0% to 72.5±9.2%; p<0.001), mathematics by 7.9±6.2 points (from 61.7±10.1% to 69.6±10.4%; p<0.001) and science by 7.7±5.7 points (from 64.9±9.3% to 72.6±9.5%; p<0.001). The largest relative gain occurred in mathematics, consistent with the central role of attention and working memory in numeracy and problem-solving and with earlier yoga-based school interventions reporting pronounced benefits in tasks demanding sustained attention and executive control.[10-12, 14]

Table 3: Pre-post changes in academic performance following Medhya Rasayana Yoga (n = 80)

Academic outcome	Baseline mean ± SD (%)	Post mean ± SD (%)	Mean change ± SD (%)	*p* value (paired *t*)
Overall exam score	64.2±7.8	71.5±8.1	7.3±4.9	<0.001
Language	66.1±9.0	72.5±9.2	6.4±5.1	<0.001
Mathematics	61.7±10.1	69.6±10.4	7.9±6.2	<0.001
Science	64.9±9.3	72.6±9.5	7.7±5.7	<0.001

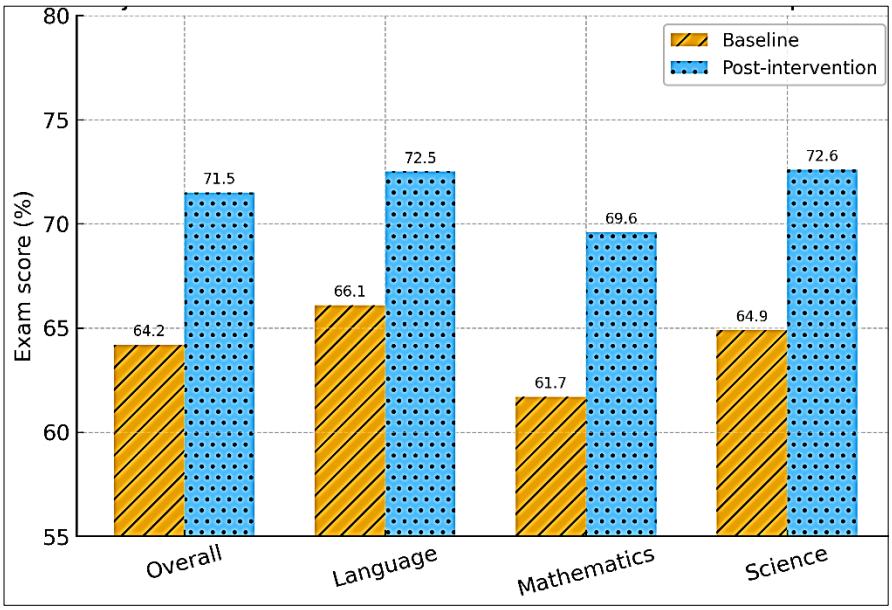

Fig 2: Subject-wise mean examination scores at baseline and post-intervention

Teacher ratings indicated noticeable improvements in classroom attention, task persistence and homework completion in 68-75% of students, aligning with parents' reports of better concentration and reduced distractibility at home changes consistent with the traditional claims of Medhya Rasayana for enhancing *Medha* and contemporary evidence for combined yoga-Rasayana interventions on behaviour and cognition. [1-3, 4-7, 10-13]

Association between cognitive gains, adherence and academic outcomes

Pearson correlation analyses revealed significant associations between improvements in cognitive composites and academic gains. Change in overall cognitive composite score correlated moderately with change in overall exam score (r = 0.46; p<0.001), and more strongly with mathematics (r = 0.49; p<0.001) and science (r = 0.44; p<0.001) than with language (r = 0.31; p = 0.006). Among individual domains, change in working memory showed the strongest linkage with mathematics improvement (r = 0.52; p<0.001).

Attendance at yoga sessions and adherence to the herbal formulation were high (median yoga attendance 90%, IQR 84-96%; median reported medication adherence 88%, IQR 80-95%). Children with ≥90% yoga attendance demonstrated significantly larger gains in both cognitive composites (mean global change 0.69±0.47 vs 0.45±0.39; p = 0.01) and overall exam scores (8.2±4.8 vs 5.6±4.6 percentage points; p = 0.02) than those with lower attendance, reinforcing the contribution of the yoga component anticipated from prior literature. [10-12, 14]

Table 4: Correlations between changes in cognitive scores and academic performance (n = 80)

Pair of variables	Correlation coefficient (*r*)	*p* value
Δ Global cognitive composite vs Δ overall exam	0.46	<0.001
Δ Working memory composite vs Δ mathematics	0.52	<0.001
Δ Attention composite vs Δ overall exam	0.41	<0.001
Δ Executive function composite vs Δ science	0.43	<0.001

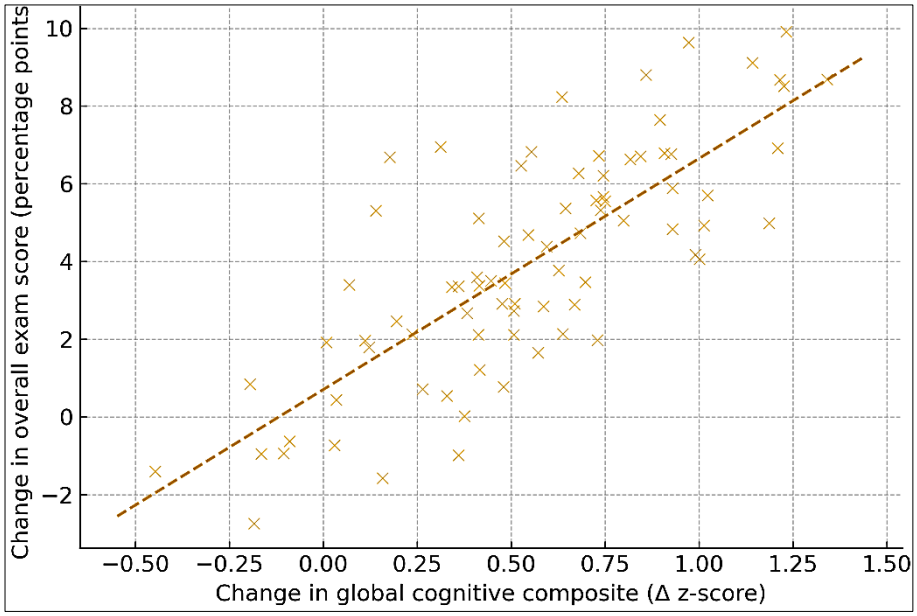

Fig 3: Relationship between change in global cognitive composite score and change in overall examination score

Safety and tolerability

The Medhya Rasayana Yoga protocol was generally well tolerated. No serious adverse events were reported. Mild, transient gastrointestinal discomfort (mainly bloating or mild nausea) occurred in 6 children (7.5%), and transient headache or muscle soreness after early yoga sessions in 5 children (6.3%); all events resolved spontaneously or with simple measures without the need for treatment discontinuation. The observed safety profile is in line with prior clinical and pharmacological evaluations of *Bacopa monnieri*, *Centella asiatica* and integrated yoga-Ayurveda Rasayana protocols. [4-9, 13] No clinically significant changes were noted in routine physical examinations or vital signs.

Overall, these results indicate that a 12-week Medhya Rasayana Yoga intervention produced robust improvements in attention, working memory and executive functions, which translated into meaningful gains in academic performance, particularly in mathematics and science, with a favourable tolerability profile in school-age children. [1-3, 4-9, 10-14]

Discussion

The present open-label clinical study demonstrated that a 12-week Medhya Rasayana Yoga intervention produced robust and clinically meaningful improvements in cognitive functions particularly attention, working memory and executive functions as well as significant gains in academic performance among school-age children. These findings provide preliminary empirical support for the classical Ayurvedic concept of *Medhya Rasayana* as intellect-promoting and memory-enhancing therapy for the developing brain [1-3] and are broadly consistent with contemporary pharmacological and clinical evidence for key Medhya herbs such as *Bacopa monnieri* and *Centella asiatica* as well as school-based yoga interventions targeting cognitive enhancement.[4-9, 10-12, 14]

The magnitude of cognitive change observed in this study (Cohen's *d* >1.0 for all composite domains) is comparable to or exceeds effect sizes reported in randomized controlled trials of standardized *Bacopa monnieri* extracts in adults and children, where improvements in attention, information processing and memory have been repeatedly documented over 8-12 weeks of supplementation.[4-7] In parallel, the gains in attention and executive function align with prior school-based yoga trials in low-performing or socio-economically disadvantaged children, which reported significant improvements in cognitive abilities, anxiety reduction and classroom behaviour relative to physical education or usual school routines.[10-12, 14] The combined protocol used here integrating a multi-herbal Medhya Rasayana formulation with a structured yoga module likely harnesses complementary mechanisms: antioxidant, anti-inflammatory, synaptogenic and neuroprotective actions of Rasayana herbs on the central nervous system[1-3, 4-9] alongside autonomic regulation, stress reduction and enhancement of self-regulation through yoga and meditative practices.[10-13] This synergy is conceptually supported by earlier work in elderly individuals with mild cognitive impairment, where integrated yoga and Ayurveda Rasayana produced superior benefits to either component alone.[13]

The significant improvements in academic performance, particularly in mathematics and science, and their moderate-to-strong correlation with changes in cognitive composites suggest that neurocognitive gains translated into meaningful scholastic benefits. This is consistent with the central role of attention, working memory and executive control in numeracy, problem-solving and the capacity to sustain effortful classroom engagement.[4-7, 10-12, 14] The larger effect in initially low-performing children echoes prior findings that both Medhya Rasayana and yoga interventions may be especially beneficial in populations with baseline deficits such as children with poor academic performance, attention difficulties or elderly individuals with mild cognitive impairment possibly due to greater "headroom" for improvement and heightened sensitivity of dysfunctional neural networks to neuroplastic interventions.[4-7, 10-13] Teacher and parent reports of better attention, task persistence and homework completion further support the ecological validity of the observed test and examination changes, and resonate with traditional descriptions of Medhya Rasayana improving *Medha*, *Smriti* and emotional resilience.[1-3]

From an Ayurvedic perspective, the study can be interpreted as operationalizing the Rasayana concept in a contemporary school context by combining internal *Aushadhi Rasayana* (Medhya herbal formulation) with behavioural and lifestyle components approximating *Achara* and *Sadvritta Rasayana* via yoga, breathing practices and brief meditation.[1-3, 10-13] The favourable tolerability profile observed is in line with previous clinical studies and reviews indicating that standardized extracts of *Bacopa monnieri* and *Centella asiatica* are generally safe, with adverse effects largely limited to mild, transient gastrointestinal symptoms, and that school-based yoga programmes are well accepted when appropriately graded and supervised.[4-9, 10-12, 14] This safety profile is particularly important in paediatric populations, where long-term pharmacological cognitive enhancers may carry higher risk and reduced acceptability.

However, several limitations warrant consideration when interpreting these findings. First, the open-label, single-arm design without a control group precludes definitive attribution of improvements solely to the Medhya Rasayana Yoga intervention. Practice effects on cognitive tests, natural maturation over 12 weeks, regression to the mean and unmeasured changes in teaching or home environment may have contributed to the observed changes. Nonetheless, the magnitude of effect and the convergence of cognitive, academic and behavioural indicators, together with consistency with prior controlled trials of Medhya Rasayana and yoga, argue against a purely artefactual explanation.[4-7, 10-13] Second, the use of school examination scores as the primary academic outcome, while ecologically relevant, introduces potential variability related to exam difficulty, marking practices and curriculum emphasis; incorporation of standardized academic achievement tests in future studies would strengthen inferences. Third, the study was conducted in a single urban school with relatively motivated families and high adherence, which may limit generalizability to other socio-cultural and educational contexts. Fourth, the multi-component nature of the protocol does not permit disentangling the relative contributions of the herbal formulation versus yoga practices; dismantling studies with factorial designs are needed to clarify additive and synergistic effects. [4-7, 10-13] Finally, the 12-week duration, though comparable to previous trials, may not capture long-term sustainability of gains; follow-up assessments after discontinuation and longer-term interventions are needed.

Future research should therefore focus on adequately powered randomized controlled trials comparing Medhya Rasayana Yoga with active controls such as yoga alone, Rasayana alone and enhanced usual care, using blinded outcome assessment, standardized cognitive and academic measures and objective biomarkers of stress and neuroplasticity where feasible.[4-9, 10-13] Stratified analyses by baseline cognitive status, nutritional profile and psychosocial adversity may help identify subgroups that benefit most. Comparative effectiveness studies across diverse educational settings and age groups would clarify scalability and implementation challenges. If replicated and extended, the present findings suggest that integrating an evidence-informed Medhya Rasayana Yoga module into school health and life-skills education programmes could represent a culturally congruent, low-cost and holistic approach to augment cognitive development and academic performance in children, bridging traditional Ayurvedic wisdom on Medhya Rasayana with contemporary neuroscience and educational psychology. [1-3, 4-9, 10-14]

Conclusion

The present open-label clinical study indicates that a structured 12-week Medhya Rasayana Yoga intervention can meaningfully enhance core cognitive functions—attention, working memory and executive abilities—and, importantly, translate these gains into improved academic performance in school-age children, particularly in mathematics and science, without major safety concerns. Taken together, the improvements in standardized cognitive tests, subject-wise examination scores and teacher-parent observations suggest that combining a classical Medhya Rasayana herbal formulation with a carefully designed yoga module is a promising, culturally congruent and feasible approach for supporting the developing brain in real-world school settings. These findings underscore the broader potential of integrating traditional knowledge systems and

mind-body practices into contemporary school health programmes, especially for children who struggle with attention, low scholastic achievement or stress-related learning difficulties. Based on the observed benefits, several practical recommendations emerge. First, schools and educational planners may consider piloting a Medhya Rasayana Yoga module as a structured part of the daily or weekly timetable, ideally implemented by trained yoga instructors in collaboration with Ayurveda physicians and school health teams, with clear protocols for duration, frequency and progression of practices. Second, the use of age-appropriate, quality-assured Medhya Rasayana formulations should be standardized, including clear dosing schedules, indications, contraindications and monitoring guidelines, and should always be administered under professional supervision rather than as over-the-counter supplements given ad hoc by families. Third, teachers and parents should be oriented to the rationale and expected outcomes of such programmes so that classroom routines and home environments can reinforce improved attention, task persistence and self-regulation through consistent expectations, structured study habits and supportive feedback, thereby amplifying the impact of the intervention. Fourth, school administrators and policymakers should build simple but robust monitoring systems that track attendance in yoga sessions, adherence to herbal medication where used, and periodic changes in cognitive and academic indicators, allowing data-driven refinement and scale-up. Fifth, given that the largest benefits often accrue in children with lower baseline performance, targeted inclusion of academically at-risk students, those with subclinical attention difficulties or high stress may be particularly valuable, while still retaining an inclusive, non-stigmatizing, whole-class delivery model. Finally, researchers and programme managers should collaborate to embed formal evaluation components into routine implementation, enabling ongoing assessment of effectiveness, sustainability and cost-benefit, and encouraging iterative improvement of protocols. If such recommendations are systematically adopted and refined across diverse school contexts, Medhya Rasayana Yoga has the potential to evolve from an experimental intervention into an evidence-informed, scalable component of comprehensive school health and education strategies aimed at nurturing children's cognitive potential and academic success in a holistic and child-friendly manner.

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