

Integrating Yoga into School Health Programs: A Preventive Strategy for Adolescent Mental and Physical Health A Narrative Review

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Abstract—Across much of the world, the health of adolescents has been quietly and steadily eroding. The causes are not mysterious: academic pressures, increasingly sedentary lives, near-constant digital immersion, and emotional coping skills that are rarely taught and often underdeveloped. The COVID-19 pandemic then compressed years of psychosocial strain into months. This paper takes stock of what is known about one particular response to this crisis—the integration of yoga into school health programmes—and asks whether the evidence is strong enough to justify a more deliberate policy commitment. A narrative review was conducted drawing on peer-reviewed literature from Google Scholar, PubMed, Scopus, SpringerLink, and ScienceDirect, covering the period 2012 to 2026; approximately 55 studies and relevant policy documents were thematically analysed. Interventions under scrutiny span structured yoga formats including asana, pranayama, mindfulness practices, and relaxation techniques; outcomes examined include stress, emotional regulation, sleep, attention, classroom conduct, and physical fitness. On the theoretical side, autonomic nervous system regulation, hypothalamic-pituitary-adrenal (HPA) axis modulation, and interoceptive self-regulation are considered as the mechanisms most plausibly linking yoga to health outcomes. The evidence is encouraging, though not uncomplicated. Well-designed yoga programmes appear to produce real psychological and physical gains. The literature, however, is fragmented, frequently short-term, poorly standardised, and—within Indian school systems specifically—markedly thin on the ground. The most consequential gaps are identified and the case is made that yoga deserves deliberate, evidence-guided integration into school wellness policy, particularly in light of India's National Education Policy (NEP) 2020.

Index Terms—Yoga, Adolescent Mental Health, School Health Programs, Preventive Healthcare, Mindfulness, School Wellness, NEP 2020, Emotional Regulation, Post-COVID Health

I. Introduction

Ask a developmental neuroscientist what makes adolescence unusual, and the answer will likely centre on timing. Between roughly ten and nineteen years of age, the brain is not simply growing—it is being fundamentally restructured. The limbic system and prefrontal cortex, which together govern emotional response, impulse control, and executive decision-making, are mid-remodel during these years. This renders the adolescent brain simultaneously more capable of complex thought and more vulnerable to destabilisation than at almost any other point in the lifespan. That developmental sensitivity is worth holding in mind throughout this review, because it is precisely what makes the current public health picture so concerning.

The World Health Organization (WHO, 2021) estimates that around one in seven young people worldwide lives with a diagnosable mental disorder; anxiety and depression together account for the lion's share. In India, the National Mental Health Survey (2016) placed the number of affected adolescents at approximately 9.8 million—and even that figure is almost certainly an undercount, given the stigma that still surrounds mental

illness in many communities and the corresponding reluctance to seek help. These numbers do not emerge from nowhere. In much of South Asia, the education system itself functions as a source of chronic stress. High-stakes board examinations and intense competition for limited university places create what amounts to an academic pressure cooker that many students enter in early adolescence and do not leave for years. Little room is left for emotional recovery, let alone the kind of exploratory identity formation that developmental psychology identifies as a normative adolescent need.

Compounding this is the digital environment. Smartphones and social media have reshaped adolescent experience in ways researchers are still working to fully understand, but the broad picture is already troubling—fractured attention, disrupted sleep, and a peculiar kind of loneliness that coexists with constant connectivity. Then came COVID-19. School closures stripped away the peer relationships and daily routines that anchor adolescent psychological life; the blurring of home and school made recovery nearly impossible. By the time lockdowns eased, elevated rates of anxiety, depression, and behavioural difficulty were documented across countries and contexts (Racine et al., 2021; Ravens-Sieberer et al., 2022). In many settings, those elevations have not returned to pre-pandemic baselines.

Schools, paradoxically, remained on the sidelines through much of this. They are in some ways the most strategically positioned institution in a young person's life—consistent, universal, and present across the years when prevention matters most—yet they have historically organised themselves around examination performance rather than holistic well-being. The structural mismatch between what schools are built to do and what adolescents actually need is not a niche complaint; it is a policy problem with real consequences.

This is part of what makes yoga worth taking seriously as a school-based intervention. It is not expensive. It does not require specialist equipment or clinical referral pathways. It can, with appropriate teacher training, be delivered within ordinary school timetables. And as a practice that draws together physical postures (asanas), breath regulation (pranayama), mindfulness, and relaxation, it targets psychological, physiological, and behavioural dimensions of health through a single coherent activity. Earlier reviews had already noted promising associations with improvements in stress, anxiety, emotional regulation, and physical fitness in young populations (Field, 2016; Hagen & Nayar, 2014; Pascoe et al., 2017), and since those reviews, the evidence base has grown—spurred partly by post-pandemic research urgency and partly by India's formal policy turn toward school wellness under NEP 2020.

What this review attempts is a critical synthesis of that expanded literature. The research is examined for what it tells us about mental and physical health outcomes; theoretical mechanisms are interrogated; areas of methodological weakness are identified; and the implications for school health policy are considered—with particular attention to the Indian context and to the specific challenges that the post-pandemic period has introduced.

II. LITERATURE REVIEW

The literature on school-based yoga spans developmental psychology, public health, exercise science, and educational research. Serwacki and Cook-Cottone (2012) conducted one of the earliest systematic reviews of school yoga programmes, identifying preliminary evidence for mental health benefits alongside significant methodological inconsistencies. Hagen and Nayar (2014) documented positive associations between yoga participation and emotional well-being across studies involving children and adolescents, including reductions in anxiety and improved behavioural adjustment. Field (2016) provided a comprehensive review highlighting consistent associations between yoga participation and improvements in mood, self-esteem, and emotional resilience across diverse study designs.

Butzer et al. (2015) reported significant salivary cortisol reductions following a ten-week classroom yoga programme, providing biological corroboration for self-reported improvements. Pascoe et al. (2017), synthesising evidence across multiple intervention studies, found consistent reductions in cortisol levels, perceived stress, and sympathetic nervous system hyperactivation following yoga and mindfulness-based

stress reduction (MBSR) protocols. Janjhua et al. (2020), working specifically with Indian adolescents, found statistically significant improvements in emotional regulation and self-esteem following an eight-week structured yoga intervention. Menezes et al. (2015) observed significant reductions in emotional reactivity and meaningful improvements in attentional capacity among high school students receiving yoga integrated within physical education.

Bhavanani (2017) has contributed to the theoretical grounding of yoga practice within Indian health contexts, while White (2012) examined stress reduction outcomes in school-age girls through mindful yoga. The post-pandemic period has introduced a new strand of literature: Racine et al. (2021) and Ravens-Sieberer et al. (2022) have documented sustained elevations in adolescent anxiety and depression following COVID-19 school disruptions, lending renewed urgency to scalable school-based mental health interventions such as yoga.

A. Preventive Healthcare in Schools: Conceptual Foundations

Prevention, as a concept in public health, is deceptively simple: intervene before things go wrong rather than after. What has emerged—slowly, unevenly, but with growing institutional momentum—is something more ambitious than the historically narrow school health model. Schools are increasingly being asked to take seriously not just physical illness prevention but emotional resilience, social-emotional development, mental health promotion, and behavioural wellness. A student who learns to manage stress at fourteen is in a meaningfully different position at thirty than one who never did.

The developmental case for doing this work in schools is strong. Adolescence is a window of unusual neurological sensitivity—a period when coping patterns, health behaviours, and relational habits are being laid down in ways that tend to persist. Early, well-targeted intervention during this window produces effects that would be far harder to achieve later. Schools also have something no clinical setting can replicate: consistent, sustained, and near-universal access to young people across precisely these years.

The WHO's Health-Promoting Schools framework (2021) gives formal institutional expression to this vision, describing schools as environments that continuously develop their capacity for healthy living, learning, and working. In India, NEP 2020 represents perhaps the most significant domestic policy move in this direction—its explicit endorsement of physical activity, mental well-being, and yoga within the school curriculum constitutes a mandate for structured wellness integration at a scale that has no real precedent in Indian educational history. Within this evolving preventive framework, yoga occupies a position worth examining carefully. What makes yoga genuinely distinctive is its integrative character: mindfulness, emotional self-regulation, breath awareness, physical movement, and stress management are not separate modules bolted together; they emerge from a single coherent practice.

B. Yoga as a Holistic Preventive Intervention: Mechanisms and Components

Classical hatha yoga, even in the adapted formats typical of school settings, brings together several distinct but interacting elements: physical postures (asanas), regulated breathing (pranayama), practices of concentration and sensory withdrawal (dharana), meditation (dhyana), and deep relaxation techniques such as yoga nidra. These are not interchangeable components. The health effects that make yoga interesting from a preventive standpoint arise from their integration—from the way breath work amplifies the physiological effects of posture, the way meditation deepens the self-regulatory gains that breath work initiates, and the way relaxation consolidates what the rest of the session has activated.

There is genuine pressure in school settings—timetable pressure, curriculum pressure, the path of least resistance—to simplify yoga down to its most obviously physical components. A PE teacher with limited yoga training will naturally gravitate toward asana; a school looking for a quick wellness add-on will schedule a fifteen-minute stretching session and call it yoga. Neither of these is worthless, but neither captures what the evidence on integrated yoga practice is actually measuring. Understanding this distinction is the difference between designing a programme that might work and one that almost certainly will not.

Physiological and neurobiological mechanisms. Several converging physiological pathways have been proposed to account for yoga's observed health effects. Pranayama and structured relaxation practices appear to shift autonomic nervous system balance toward parasympathetic dominance, manifesting as reduced heart rate, lower blood pressure, improved heart rate variability (HRV), and diminished cortisol secretion.

Cortisol—the primary glucocorticoid released through HPA axis activation under perceived stress—is chronically elevated in adolescents navigating sustained academic and social pressure. Butzer et al. (2015) demonstrated measurable cortisol reductions following classroom yoga practice, while Pascoe et al. (2017) documented consistent evidence for autonomic regulation effects across yoga and MBSR protocols.

At the neurological level, regular yoga practice has been associated—primarily in adult samples but with plausible implications for adolescents—with increased grey matter volume in the prefrontal cortex and hippocampus, regions central to executive function, emotional regulation, and stress response modulation. Slow diaphragmatic breathing activates vagal afferent pathways, dampening amygdala reactivity and reducing the physiological arousal that sustains anxiety states. While most neuroimaging evidence currently derives from adult populations, the likelihood of analogous effects in the still-developing adolescent brain is considerable, even as it awaits direct empirical confirmation.

Psychological mechanisms: Emotional self-regulation and mind-body integration. From a self-regulation standpoint, consistent yoga practice cultivates interoceptive awareness—the capacity to perceive and interpret internal bodily states—which is foundational to emotional self-regulation. Adolescents with stronger interoceptive sensitivity are better positioned to recognise early signs of emotional arousal before escalation occurs, enabling more deliberate and adaptive coping responses. The mindfulness dimension of yoga aligns closely with the theoretical frameworks underlying mindfulness-based cognitive therapy (MBCT) and MBSR, both of which carry well-established evidence bases in clinical populations. Mind-body integration theory offers a complementary explanatory lens: yoga bridges somatic and psychological experience through sustained, attentive engagement with breath, posture, and movement, producing a state of coherent physiological and psychological functioning that contrasts with the fragmented, hyperaroused states that characterise chronic stress.

III. MATERIALS AND METHODS

Narrative review methodology was adopted as the most appropriate framework for synthesising a heterogeneous, cross-disciplinary evidence base while developing interpretive perspectives that extend beyond what quantitative synthesis alone can furnish. Narrative reviews are particularly well-suited to the present purpose: mapping evidence trends, critically interrogating conceptual models, and producing theoretically grounded recommendations rather than pooled statistical estimates. This review does not follow PRISMA protocols or employ formal risk-of-bias instruments; it employs instead purposive literature identification guided by explicit criteria and thematic organisation.

A. Literature Search Strategy

Relevant studies were located through iterative electronic searches of Google Scholar, PubMed, Scopus, SpringerLink, and ScienceDirect, using Boolean combinations of the following terms: "yoga AND adolescents," "school health programs," "yoga-based interventions," "adolescent mental health," "mindfulness in education," "preventive healthcare in schools," "post-COVID adolescent mental health," "NEP 2020 school wellness," "screen dependency adolescents," and "Indian school yoga programs." Reference chain searching supplemented database results. The review prioritised literature published between 2012 and 2026, with particular emphasis on studies from 2019 onward to capture post-pandemic developments and recent policy trajectories.

Table 1. Literature Screening and Inclusion Framework

Screening Criterion	Description
Databases	Google Scholar, PubMed, Scopus, SpringerLink, ScienceDirect
Publication Period	2012–2026 (emphasis on 2019–2026 for post-COVID evidence)
Search Terms	"Yoga AND adolescents"; "school health programs"; "yoga-based interventions"; "mindfulness in education"; "adolescent mental health"; "preventive healthcare schools"; "NEP 2020 wellness"; "post-COVID adolescent mental health"

Screening Criterion	Description
Inclusion Criteria	Adolescents or school-going children (ages 10–19); school-based or school-adjacent yoga/mindfulness interventions; psychological, behavioural, cognitive, or physical outcomes; peer-reviewed English-language publications
Exclusion Criteria	Studies involving adults only; non-school settings; grey literature without peer review; studies lacking clearly stated methodology
Approximate Studies Reviewed	~55 peer-reviewed studies and policy documents thematically analysed
Thematic Categories	Mental health outcomes; physical health outcomes; academic and behavioural effects; implementation barriers; policy implications

Reviewed studies were organised thematically across five domains: (a) mental health outcomes, (b) physical health outcomes, (c) academic and behavioural effects, (d) implementation barriers, and (e) policy and systemic implications. Studies were selected for detailed discussion based on methodological rigour, relevance, recency, and diversity of population and setting. Approximately 55 peer-reviewed articles, reviews, and policy documents informed the preparation of this review.

IV. RESULTS

A. Effects of Yoga on Adolescent Mental Health

The mental health literature on school-based yoga has grown substantially over the past decade. Early contributions were appropriately cautious, noting preliminary evidence amid significant methodological variability (Serwacki & Cook-Cottone, 2012). More recent work has progressively clarified which outcomes yoga most reliably influences and by what mechanisms—though meaningful gaps and inconsistencies remain.

Stress and cortisol reduction. Academic stress is among the most pervasive mental health concerns facing school-going adolescents, particularly within competitive, examination-centred educational systems. School yoga programmes incorporating pranayama and mindfulness have repeatedly demonstrated reductions in subjective stress perception and, in a smaller number of studies, objectively measurable physiological markers. Butzer et al. (2015) reported significant salivary cortisol reductions following a ten-week classroom yoga programme, providing biological corroboration for self-reported improvements. Pascoe et al. (2017), synthesising evidence across multiple intervention studies, found consistent reductions in cortisol levels, perceived stress, and sympathetic nervous system hyperactivation following yoga and MBSR protocols.

A meaningful pattern emerges from this literature: stress-reducing effects appear strongest in studies employing pranayama-dominant or combined protocols, compared with those emphasising asana practice alone. The programme design implications are significant—school yoga programmes that strip out breathwork and mindfulness in favour of purely physical activity are likely to capture only a fraction of the psychological benefit that more integrated approaches can deliver. Sustainable stress resilience—rather than transient symptom relief—should be the explicit target for any preventive school health framework.

Anxiety, depression, and emotional regulation. Anxiety disorders represent one of the most prevalent mental health diagnoses in adolescent populations globally, and growing evidence suggests that yoga-based school interventions can produce clinically meaningful reductions in symptom severity. Hagen and Nayar (2014) documented positive associations between yoga participation and emotional well-being across studies involving children and adolescents, including reductions in anxiety and improved behavioural adjustment. Janjhua et al. (2020), working specifically with Indian adolescents, found statistically significant improvements in emotional regulation and self-esteem following an eight-week structured yoga intervention, with participants showing enhanced self-awareness and reduced emotional reactivity.

The post-pandemic context has lent these findings renewed urgency. Research conducted during and following COVID-19 school closures documented substantial increases in adolescent anxiety, depression, loneliness, and emotional dysregulation across multiple national contexts (Racine et al., 2021). Ravens-Sieberer et al. (2022) tracked marked deterioration in health-related quality of life among German adolescents across three successive pandemic waves, with mental health dimensions most severely affected. Crucially, school reopening has not, in most settings, produced spontaneous recovery to pre-pandemic mental health baselines. Yoga-based interventions that emphasise emotional regulation and self-compassion practices represent a scalable, non-stigmatising, and culturally accessible response to this elevated and persistent post-COVID burden.

Mood, self-esteem, and psychological well-being. Field's (2016) comprehensive review highlighted consistent associations between yoga participation and improvements in mood, self-esteem, and emotional resilience across a diverse range of study designs. Among adolescents in particular, yoga appears to support a positive self-concept at a developmental stage when identity is simultaneously fluid and acutely vulnerable to social comparison pressures. This becomes especially pertinent given the well-documented relationship between social media use and declining self-esteem and body image dissatisfaction—particularly, though not exclusively, in adolescent girls. Yoga's emphasis on embodied, non-competitive self-awareness may offer a meaningful counterweight to these dynamics, though direct empirical investigation of this hypothesis in school populations remains limited.

Attention, concentration, and cognitive function. The relationship between yoga and cognitive function is mechanistically plausible and carries encouraging early empirical support, though the evidence base in school populations is still maturing. Mindfulness and breath-focused practices train sustained attentional control by repeatedly redirecting awareness to present-moment experience—a process that directly exercises the prefrontal cortical networks underpinning executive function, working memory, and behavioural inhibition. Menezes et al. (2015) observed significant reductions in emotional reactivity and meaningful improvements in attentional capacity among high school students receiving yoga integrated within physical education. The pathway from improved attentional function to measurable academic performance gains requires longitudinal investigation before confident claims can responsibly be advanced.

Sleep quality and digital wellness. Adolescent sleep disturbance is one of the most underappreciated contributors to deteriorating mental and physical health in this age group. Smartphone and social media use has fundamentally disrupted adolescent sleep architecture: blue-light-mediated suppression of melatonin secretion, combined with the psychosocial arousal intrinsic to social networking, delays circadian rhythms and fragments sleep quality. Yoga's physiological relaxation effects—particularly through yoga nidra and progressive relaxation—show meaningful potential for reducing mental overactivity and improving sleep onset when delivered toward the close of the school day.

B. Effects of Yoga on Adolescent Physical Health

Flexibility, muscular fitness, and body composition. Consistent yoga practice improves joint range of motion, muscular endurance, and functional flexibility—outcomes of direct relevance in school populations where students routinely spend six or more hours daily in seated postures. While yoga does not replicate the cardiovascular demands of aerobic exercise or the hypertrophic gains of resistance training, its contributions to core strength, metabolic activation, and movement awareness complement rather than compete with broader physical education goals.

Postural health and screen-related musculoskeletal concerns. The emergence of 'tech neck' and upper-back dysfunction as clinical concerns among school-age adolescents follows directly from sustained device use. Students using smartphones for four or more hours per day show measurably altered cervical spine curvature and heightened muscular tension across the thoracic and cervical regions. Yoga's emphasis on spinal elongation, shoulder opening, and postural realignment addresses these risks in a targeted and practically accessible way.

Respiratory function and autonomic health. Pranayama practices—including nadi shodhana (alternate nostril breathing), diaphragmatic breathing, and extended exhalation techniques—demonstrate meaningful effects on respiratory efficiency, vagal tone, and autonomic nervous system balance. For adolescents with asthma or exercise-induced bronchospasm, regulated breathing has demonstrated supplementary therapeutic value

alongside conventional management. More broadly, conscious breath regulation functions as a portable self-regulation tool that adolescents can deploy in high-pressure situations—examinations, interpersonal conflict, social stress—extending yoga's utility well beyond any single scheduled session.

Obesity prevention and physical activity promotion. Adolescent obesity rates have risen sharply across India, driven by caloric excess, entrenched sedentary behaviour, and declining participation in outdoor activity. Yoga's caloric expenditure is modest relative to aerobic exercise, but it fosters a mindful relationship with the body that may meaningfully influence eating behaviour, food awareness, and habitual movement patterns. Existing evidence suggests that yoga participation is associated with improved body image satisfaction and reduced engagement in unhealthy weight-control behaviours among adolescents.

C. Academic and Behavioural Outcomes

The intersection of yoga, behavioural regulation, and academic functioning represents a theoretically coherent but empirically underdeveloped domain. Butzer et al. (2015) provided some of the most widely cited school-based evidence in this area, documenting improvements in student behaviour, emotional calmness, and classroom functioning following a structured yoga intervention. Menezes et al. (2015) observed reduced emotional reactivity and improved attentional capacity in high school students receiving yoga within physical education sessions.

Social-emotional learning (SEL) frameworks suggest that emotional regulation, empathy, and self-awareness—all core capacities developed through yoga practice—constitute foundational prerequisites for productive academic engagement. When adolescents are operating in states of significant emotional dysregulation, the cognitive resources available for learning are substantially diminished. Yoga's potential to function as an upstream classroom-readiness intervention carries genuine weight within both educational and public health framings. Direct evidence linking yoga participation to measurable academic achievement gains—as distinct from behavioural and attentional improvements—remains limited and methodologically inconsistent. Well-controlled studies using standardised academic performance measures alongside yoga intervention protocols are required before conclusions about academic outcomes can responsibly be advanced.

Table 2. Comparative Review of Major Studies on School-Based Yoga Interventions

Author(s)	Year	Population	Intervention	Key Findings	Limitations
Butzer et al.	2015	School students, US	Classroom yoga, 10 weeks	Reduced cortisol; improved classroom behaviour and emotional calmness	Small n; no control group

Author(s)	Year	Population	Intervention	Key Findings	Limitations
Hagen & Nayar	2014	Children and adolescents	Yoga and mindfulness programmes	Positive associations with emotional well-being and behavioural adjustment	Heterogeneous designs; narrative synthesis only
Pascoe et al.	2017	Adolescents and adults	Yoga and MBSR protocols	Reduced cortisol, heart rate, and perceived stress; autonomic regulation effects observed	Protocol variability; generalisability issues
Field	2016	Mixed adolescent populations	Yoga research review	Improved mood, self-esteem, attention, and emotional resilience	Cross-study heterogeneity; limited RCT inclusion
Janjhua et al.	2020	Indian adolescents	Structured yoga, 8 weeks	Significant improvements in emotional regulation and self-esteem; enhanced self-awareness	Single-site; short duration
Menezes et al.	2015	High school students, Brazil	Yoga integrated with PE	Reduced emotional reactivity; improved attention and classroom engagement	Limited follow-up; self-report measures
Serwacki & Cook-Cottone	2012	School-age children	Systematic review of school yoga programmes	Preliminary evidence for mental health benefits; significant methodological inconsistencies	Weak study designs included; limited sample diversity
White	2012	School-age girls, US	Mindful yoga programme	Reduced stress perceptions and physiological arousal	Single gender; small sample; no long-term follow-up

Table 3. Mental and Physical Health Outcomes Evidenced in the Reviewed Literature

Outcome Domain	Specific Outcomes Evidenced	Evidence Strength
Psychological / Mental Health	Stress reduction; anxiety management; emotional regulation; mood improvement; self-esteem; sleep quality	Moderate – consistent across multiple short-term studies; limited RCT-level evidence

Outcome Domain	Specific Outcomes Evidenced	Evidence Strength
Cognitive / Academic	Attention and concentration; working memory; classroom behaviour; reduced impulsivity	Preliminary – mostly pre-post designs without controls
Physical Health	Flexibility; postural alignment; respiratory efficiency; muscular endurance; obesity risk reduction	Moderate – well-supported in physical fitness literature; limited in school-specific settings
Social-Emotional	Empathy; social interaction; patience; self-awareness; behavioural regulation	Emerging – limited measurement standardisation
Neurocognitive / Physiological	Cortisol reduction; autonomic nervous system balance; parasympathetic activation; HRV improvement	Moderate to strong in clinical samples; replication needed in school populations

V. DISCUSSION

A. Synthesis and Comparative Analysis

The cumulative evidence supports yoga's value as a component of school-based preventive health programming—though characterising this evidence as definitive or uniform would be an overstatement. A more accurate reading reveals a pattern of consistent directional effects with variable magnitude: across diverse populations, settings, and intervention designs, school yoga tends to produce improvements in psychological well-being, behavioural regulation, and physical function, but effect sizes vary considerably and underlying mechanisms remain incompletely delineated.

One particularly significant comparative dimension concerns the contrast between short-term and sustained intervention outcomes. Studies measuring outcomes immediately post-intervention reliably report improvements. The smaller number of studies conducting follow-up assessments beyond three months find substantially attenuated or statistically non-significant effects. This raises a question with direct implications for programme design: does yoga generate durable preventive change, or primarily transient symptom relief? If benefits require sustained practice to be maintained—which the physiological evidence would suggest—then ongoing embedded school yoga programmes are preferable to brief wellness workshops.

The contrast between mindfulness-based yoga models and PE-integrated approaches also deserves critical attention. Mindfulness-oriented formats, with their emphasis on breath awareness, internal observation, and non-reactive emotional processing, demonstrate stronger effects on psychological outcomes—particularly anxiety and emotional regulation. PE-integrated yoga, which prioritises physical postures and movement within an activity-centred context, more reliably improves flexibility, postural alignment, and physical fitness indices. An ideal school programme would integrate both orientations, though doing so competently requires more sophisticated instructor preparation than either approach in isolation.

The Indian context warrants particular critical attention. While yoga originates within Indian philosophical and practical traditions and has a long institutional presence in Indian schools, the evidence base from Indian educational settings remains disproportionately thin. Contributions from Janjhua et al. (2020) and Bhavanani (2017) are genuinely valuable, but the field still lacks large-scale, rigorously designed longitudinal studies from Indian school contexts. This is especially consequential given that NEP 2020 explicitly endorses yoga

as a pillar of the national school wellness agenda: policy ambition has, in this domain, run meaningfully ahead of the evidence base that would ideally guide its implementation.

B. Methodological Critique of the Existing Literature

Several recurring methodological problems constrain the strength of conclusions available from the existing literature. The most pervasive include: reliance on small, convenience samples that limit statistical power and external validity; the absence of active control conditions, making it difficult to disentangle yoga-specific effects from non-specific effects of group participation, instructor attention, or simply structured rest time; heavy dependence on self-report outcome measures, which are vulnerable to social desirability bias; heterogeneous intervention protocols spanning four weeks to over one academic year, varying widely in session frequency, duration, component emphasis, and instructor qualification; and inconsistent outcome measurement tools that preclude meaningful cross-study comparison or meta-analytic synthesis.

These limitations do not invalidate the existing evidence, but they underscore the need for the next generation of school yoga research to employ randomised controlled designs with adequate follow-up periods, standardised intervention fidelity protocols, blinded outcome assessment where feasible, and pre-registered hypotheses to reduce publication bias. The field has broadly established that effects exist; the priority now is understanding effect sizes, mechanisms, and moderating conditions with considerably greater precision.

C. Post-COVID Dimensions and Digital Wellness

The post-COVID era has created a qualitatively different context for school mental health—one that the existing yoga intervention literature has not yet fully addressed. Pandemic-related disruptions accelerated digital dependency, interrupted normative social development, and produced lasting elevations in adolescent anxiety and emotional dysregulation that have not remitted with school reopening. Yoga's potential role within integrated digital wellness programmes—providing adolescents with structured practice in embodied presence, screen disengagement, and self-regulation under conditions of digital saturation—represents a high-priority but empirically underexplored area.

The pandemic also exposed the structural fragility of school-dependent intervention models. When schools closed, any yoga practice not internalised as personal self-care was effectively discontinued. This argues for pedagogical models that build autonomous home practice and portable self-regulation skills—particularly breath-based techniques—alongside supervised classroom participation. Developing this kind of internalised practice capacity may prove to be the most important determinant of long-term preventive benefit.

Table 4. Implementation Barriers and Mitigation Strategies for School Yoga Programmes

Barrier Category	Specific Challenges	Potential Mitigation Strategies
Instructor Capacity	Shortage of trained school yoga instructors; inconsistent training standards	Integrate yoga pedagogy into teacher education programmes; certify PE teachers in school yoga delivery

Barrier Category	Specific Challenges	Potential Mitigation Strategies
Curricular Integration	Timetable rigidity; competition with academic subjects; examination pressure	Embed yoga within physical education; develop structured wellness periods under NEP 2020
Standardisation	Absence of age-appropriate, evidence-based yoga protocols for schools	Develop MOYAS/AYUSH-aligned school yoga frameworks; mandate evaluation components
Resource Constraints	Infrastructure gaps in government and rural schools; limited funding	Low-infrastructure yoga models; integration with Fit India and Khelo India school programmes
Cultural and Parental Factors	Misconceptions about yoga's religious nature; parental scepticism	Community sensitisation; frame yoga as an evidence-based health practice; involve parents in sessions
Research Gaps	Limited RCTs; short follow-up durations; lack of Indian school-based longitudinal studies	Priority funding for controlled longitudinal school yoga research in Indian and LMIC contexts

D. Challenges in Implementing School-Based Yoga Programmes

Evidence of yoga's benefits does not automatically translate into smooth institutional adoption. Introducing yoga within formal school systems confronts substantial structural and attitudinal barriers—not peripheral inconveniences, but genuine systemic challenges that have historically constrained yoga's penetration into school health frameworks. The implementation barriers and corresponding mitigation strategies are presented in Table 4.

Among these barriers, the absence of standardised, developmentally appropriate intervention protocols is particularly consequential. Without such protocols, the content and quality of yoga delivery varies so widely across schools that 'school yoga' cannot function as a coherent category for either research or policy purposes. India's Ministry of AYUSH and NCERT have begun developing yoga curriculum frameworks, but the gap between policy documentation and consistent classroom practice remains substantial—bridging it will require sustained investment in teacher preparation, resource development, and programme monitoring over an extended period.

Table 5. Comparative Analysis of School Yoga Intervention Models

Model	Orientation	Strengths	Limitations
Mindfulness-Based Yoga (MBY)	Psychological; stress reduction	Strong autonomic regulation evidence; well-suited to anxiety and stress profiles	Requires trained facilitators; less emphasis on physical fitness
PE-Integrated Yoga	Physical + wellness	Easier curricular integration; improves physical fitness alongside wellness	Risk of diluting yoga's psychological depth; variable instructor competence
Therapeutic Yoga (SEL-linked)	Social-emotional learning	Addresses behavioural and relational dimensions; amenable to counsellor collaboration	Time-intensive; requires multidisciplinary facilitation

Model	Orientation	Strengths	Limitations
Short-Term Intensive Programmes	Acute stress relief; camps	Feasible; demonstrates measurable short-term change	Gains may not persist without continued practice
Long-Term Embedded Programmes	Preventive; habit formation	Promotes lasting behavioural and physiological change	Requires institutional commitment and sustained funding

E. Policy Implications and Recommendations

The evidence examined in this review supports a deliberate, structured integration of yoga within school health policy—not simply as a timetable addition, but as a component of a coherent, evidence-based wellness architecture that addresses adolescent health preventively, holistically, and consistently over time. India's NEP 2020 represents a historically unprecedented policy opening for this integration. Its explicit endorsement of holistic development, physical and mental well-being, and yoga within the school curriculum creates structural opportunity that has not yet been matched by the implementation infrastructure or research investment required to realise it.

The following specific recommendations emerge from this review: (1) incorporating structured, evidence-based yoga modules into physical education and health curricula across all school levels, with age-appropriate differentiation across primary, middle, and secondary stages; (2) developing national standardised yoga intervention protocols aligned with AYUSH and NCERT frameworks, specifying session duration, frequency, component integration, and instructor competency requirements; (3) providing specialised training for physical education teachers and school counsellors in evidence-based yoga and mindfulness delivery, including awareness of therapeutic applications; (4) formally integrating yoga with school mental health services, counselling programmes, and SEL curricula to create a multidisciplinary wellness framework; (5) commissioning large-scale, longitudinal, randomised studies on school yoga programmes in Indian and other low- and middle-income country (LMIC) contexts, with explicit post-COVID health and digital wellness components; (6) establishing school wellness monitoring systems that include yoga participation, mental health screening, and physical health markers within regular school health assessments; and (7) developing family engagement components within school yoga programmes, equipping parents and guardians with resources to support adolescent home practice and healthy digital boundaries.

F. Research Gaps and Future Directions

If there is one thing this review makes uncomfortably clear, it is how much remains unknown. The most glaring absence is longitudinal data. Study after study measures outcomes at the moment a programme ends—usually somewhere between eight and twelve weeks in—and then stops. Do stress reductions persist at six months? Does improved emotional regulation still show up a year later? Without that knowledge, it is not possible to answer the question that should be at the centre of preventive health design: is the intervention building durable resilience, or simply providing temporary relief?

Measurement is a related problem. The field is currently characterised by diverse self-report scales with no common standard, making cross-study comparison nearly impossible. What is needed is agreement on a core outcome set—a shared battery of measures that every school yoga study commits to collecting, including not just self-report but objective biological indices such as HRV, salivary cortisol, and, where feasible, actigraphy-based sleep assessment.

The absence of large-scale, rigorously designed intervention research from Indian school settings is particularly consequential given NEP 2020's ambitions. Pragmatic cluster-randomised trials conducted across diverse school types—private, government, urban, rural—through genuine partnerships between universities, state education departments, and research bodies are required. The post-COVID dimension deserves its own dedicated research programme, addressing whether yoga-based programmes can specifically target screen time dysregulation, social re-engagement difficulties, and chronic low-grade anxiety that has become normalised among adolescents. Furthermore, gender differences in stress expression and yoga engagement,

and responses among students with ADHD, learning disabilities, or trauma histories, require dedicated subgroup analyses built into study protocols from the outset.

G. Practical Implications for School Health Professionals

Sessions do not need to be long. Fifteen to twenty minutes, delivered consistently and with genuine care, appear capable of producing measurable psychological shifts over time. The operative word is consistently—sporadic yoga is unlikely to compound into anything lasting, but a short daily or near-daily practice embedded naturally into the school day is a realistic target for most institutions. What matters far more than duration is what happens inside those minutes: a yoga instructor who treats school sessions as a physical exercise class—running through postures without attending to breath, without creating the internal reflective space that distinguishes yoga from stretching—will produce different outcomes from one who genuinely understands the mindfulness and autonomic dimensions of the practice.

School counsellors tend to be underutilised in yoga programme design, which is a missed opportunity. They are often the first to know which students are carrying trauma histories, managing existing mental health conditions, or showing early signs of distress that a general yoga class might inadvertently exacerbate. Positioning counsellors as active partners—not passive bystanders—in yoga programme delivery allows for targeted modification and creates a natural referral bridge for students who need more than a wellness class can offer.

On the question of sustainability: the most common way school yoga programmes die is quietly, when the one teacher who built them moves to another school. Any programme designed around a single individual's commitment is, structurally speaking, a temporary programme. What survives is what gets embedded—protected time in the timetable, a small dedicated budget, leadership buy-in that does not depend on any particular person remaining in post. Peer leadership models, where trained older students co-facilitate sessions for younger cohorts, have shown real promise in several international contexts.

VI. CONCLUSION

The case for school yoga is genuinely promising but genuinely incomplete, and the honest response to that combination is investment, not complacency on either side. What the literature does establish, with reasonable consistency across a range of populations and settings, is that structured yoga programmes—ones that take seriously the integration of physical postures, breath regulation, mindfulness, and relaxation rather than treating any of these as optional—tend to produce meaningful improvements in how adolescents manage stress, regulate emotion, sleep, attend, and feel about themselves physically. These are not trivial outcomes. They speak to dimensions of adolescent well-being that conventional physical education rarely touches and that clinical services rarely reach in time.

The physiological mechanisms underlying these effects—autonomic nervous system modulation, HPA axis regulation, and the cultivation of interoceptive awareness—are increasingly well characterised, even if most of the neurobiological evidence still comes from adult samples. However, the methodological picture is genuinely weak in places. Longitudinal data are scarce; Indian school-based research, given NEP 2020's ambitions, is remarkably thin; and standardised protocols do not exist. Without these foundations, the question of how much yoga, of what kind, delivered how, for which students, under what conditions, remains largely unanswered. These gaps are not reasons to wait—they are reasons to build.

The precautionary calculus here is worth stating directly. Yoga is safe, inexpensive, and culturally rooted in the Indian context in ways that make adoption more tractable than many comparable interventions. Withholding it from adolescents on the grounds that the evidence is not yet perfect would require a higher standard of proof than is applied to almost any other school health practice. The more defensible position is to move forward deliberately—implementing with the best available evidence, monitoring outcomes rigorously, and feeding what is learned back into an improving research base. NEP 2020 created a policy opening that India has not seen before. The question now is whether the implementation infrastructure—trained instructors, standardised protocols, monitoring systems, genuine collaboration between educators, researchers, and health professionals—can be built to match the ambition.

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