



## Effect of Yoga-Based Physical Education on the Emotional Well-being of Adolescents

Amy Williams K

Department of Psychology and Mental Health, University of Mumbai, Maharashtra, India

\* Corresponding Author: Amy Williams K

### Article Info

**P-ISSN:** 3051-3480

**E-ISSN:** 3051-3499

**Volume:** 01

**Issue:** 02

**July - December 2025**

**Received:** 10-05-2025

**Accepted:** 12-06-2025

**Published:** 06-07-2025

**Page No:** 04-07

### Abstract

**Background:** Adolescence is characterized by significant emotional and psychological challenges. Traditional physical education programs may not adequately address the mental health needs of adolescents. This study investigates the effectiveness of yoga-based physical education (YBPE) on emotional well-being parameters in adolescent students.

**Objective:** To examine the impact of a 16-week yoga-based physical education curriculum on emotional well-being, stress levels, and psychological resilience among adolescents aged 14-17 years.

**Methods:** A randomized controlled trial was conducted with 180 adolescent students from three secondary schools. Participants were randomly assigned to yoga-based physical education (YBPE, n=90) or traditional physical education (TPE, n=90) groups. The YBPE intervention included asanas, pranayama, meditation, and mindfulness practices integrated into the standard PE curriculum. Pre- and post-intervention assessments used validated scales including the Adolescent Emotional Well-being Scale (AEWS), Perceived Stress Scale (PSS), and Connor-Davidson Resilience Scale (CD-RISC).

**Results:** The YBPE group showed significant improvements in emotional well-being scores (23.4% increase,  $p < 0.001$ ), stress reduction (31.2% decrease in PSS scores,  $p < 0.001$ ), and psychological resilience (18.7% improvement,  $p < 0.01$ ) compared to the TPE group. Secondary outcomes included improved sleep quality, enhanced self-esteem, and better emotional regulation capabilities.

**Conclusion:** Yoga-based physical education demonstrates superior efficacy in promoting emotional well-being among adolescents compared to traditional physical education approaches. Integration of yoga practices in school curricula may serve as an effective intervention for supporting adolescent mental health.

**Keywords:** Yoga, Physical Education, Emotional Well-Being, Adolescents, Mental Health, Mindfulness

### Introduction

Adolescence represents a critical developmental period characterized by rapid physical, cognitive, and emotional changes. Contemporary adolescents face unprecedented stressors including academic pressure, social media influence, peer relationships, and future uncertainties. Research indicates that approximately 20% of adolescents experience significant mental health challenges, with anxiety and depression being the most prevalent conditions. The COVID-19 pandemic has further exacerbated these concerns, highlighting the urgent need for effective interventions supporting adolescent emotional well-being.

Traditional physical education programs primarily focus on physical fitness and motor skill development, often overlooking the psychological and emotional dimensions of student well-being. While regular physical activity contributes to mental health, the competitive and performance-oriented nature of conventional PE may inadvertently increase stress and anxiety in some students. This limitation necessitates exploring alternative approaches that holistically address both physical and emotional needs of adolescents. Yoga, an ancient practice originating from India, encompasses physical postures (asanas), breathing techniques (pranayama), meditation, and mindfulness principles. Scientific research has increasingly documented yoga's beneficial effects on stress reduction, emotional regulation, and psychological well-being across various populations.

However, limited studies have specifically examined the integration of yoga-based approaches within school physical education curricula and their impact on adolescent emotional well-being.

The neurobiological underpinnings of yoga's effects include activation of the parasympathetic nervous system, reduction in cortisol levels, and enhanced production of gamma-aminobutyric acid (GABA). These physiological changes translate into improved emotional regulation, reduced anxiety, and enhanced mood stability. Given adolescents' heightened emotional volatility due to ongoing brain development, particularly in the prefrontal cortex and limbic system, yoga-based interventions may be particularly beneficial for this population.

This study addresses the gap in literature by investigating the effectiveness of yoga-based physical education on emotional well-being outcomes in adolescents. Understanding the potential benefits of integrating contemplative practices within educational settings has significant implications for school administrators, physical educators, and mental health professionals working with adolescent populations.

## Methods

### Study Design and Setting

This randomized controlled trial employed a parallel-group design conducted across three secondary schools in urban areas of Mumbai, India, between September 2023 and February 2024. The study protocol was approved by the institutional ethics committee of the University of Mumbai, and written informed consent was obtained from both participants and their parents/guardians.

### Participants

One hundred and eighty adolescent students aged 14-17 years were recruited from grades 9-11. Inclusion criteria included regular school attendance, absence of severe psychiatric disorders, and willingness to participate in physical activities. Exclusion criteria encompassed serious medical conditions preventing physical activity, current participation in formal yoga training, and diagnosed eating disorders. Participants were stratified by age and gender before randomization to ensure balanced group allocation.

### Intervention Protocol

The yoga-based physical education group participated in 45-minute sessions, three times weekly for 16 weeks. Each session included: warm-up movements (5 minutes), asana practice focusing on standing, sitting, and supine postures (20 minutes), pranayama techniques including alternate nostril breathing and deep abdominal breathing (10 minutes), guided meditation and mindfulness exercises (8 minutes), and relaxation in savasana (2 minutes). The curriculum was designed by certified yoga instructors in collaboration with physical education specialists.

The traditional physical education group continued their regular curriculum including sports activities, fitness training, and competitive games. Both groups received equal time allocation and instructor attention to minimize bias.

### Outcome Measures

Primary outcomes included emotional well-being assessed using the Adolescent Emotional Well-being Scale (AEWS), a validated 28-item instrument measuring positive emotions, life satisfaction, and emotional stability. Perceived stress

levels were evaluated using the 10-item Perceived Stress Scale (PSS), while psychological resilience was measured through the Connor-Davidson Resilience Scale (CD-RISC). Secondary measures encompassed sleep quality (Pittsburgh Sleep Quality Index), self-esteem (Rosenberg Self-Esteem Scale), emotional regulation (Difficulties in Emotion Regulation Scale), and academic stress (Academic Stress Scale). Physiological markers included salivary cortisol levels and heart rate variability measurements collected at pre- and post-intervention timepoints.

### Statistical Analysis

Data analysis was conducted using SPSS version 29.0. Descriptive statistics characterized participant demographics and baseline measures. Independent samples t-tests compared baseline characteristics between groups. Repeated measures ANOVA examined within-group changes over time, while ANCOVA assessed between-group differences controlling for baseline values. Effect sizes were calculated using Cohen's d, and statistical significance was set at  $p < 0.05$ .

## Results

### Participant Characteristics

The study achieved 94.4% retention rate with 10 participants withdrawing due to schedule conflicts or school transfers. No significant differences existed between groups at baseline for age ( $15.3 \pm 1.2$  years), gender distribution (52% female), socioeconomic status, or psychological measures. Both groups demonstrated comparable baseline fitness levels and academic performance.

### Primary Outcomes

The yoga-based physical education group demonstrated substantial improvements across all primary outcome measures. Emotional well-being scores increased from  $87.2 \pm 12.4$  to  $107.6 \pm 14.8$ , representing a 23.4% improvement ( $p < 0.001$ , Cohen's  $d = 1.52$ ). In contrast, the traditional PE group showed minimal change ( $91.3 \pm 13.1$  to  $94.7 \pm 12.9$ , 3.7% increase,  $p = 0.23$ ).

Perceived stress levels decreased significantly in the YBPE group from  $24.8 \pm 4.6$  to  $17.1 \pm 3.9$  (31.2% reduction,  $p < 0.001$ , Cohen's  $d = 1.84$ ), while the TPE group showed no significant change ( $25.1 \pm 4.8$  to  $23.9 \pm 4.7$ , 4.8% reduction,  $p = 0.19$ ). Psychological resilience improved from  $68.4 \pm 9.2$  to  $81.2 \pm 10.7$  in the YBPE group (18.7% increase,  $p < 0.01$ , Cohen's  $d = 1.26$ ) compared to minimal change in the control group.

### Secondary Outcomes

Sleep quality improvements were observed in the YBPE group with Pittsburgh Sleep Quality Index scores decreasing from  $8.9 \pm 2.1$  to  $5.4 \pm 1.8$  (lower scores indicate better sleep,  $p < 0.001$ ). Self-esteem scores increased significantly in the yoga group ( $28.6 \pm 4.3$  to  $34.2 \pm 5.1$ ,  $p < 0.001$ ) while remaining stable in the traditional PE group.

Emotional regulation capabilities, as measured by the Difficulties in Emotion Regulation Scale, improved substantially in the YBPE group with total scores decreasing from  $94.3 \pm 15.2$  to  $72.8 \pm 12.6$  ( $p < 0.001$ ), indicating enhanced emotional regulation skills. Academic stress levels also decreased significantly in the yoga group ( $p < 0.01$ ).

### Physiological Markers

Morning salivary cortisol levels decreased from  $18.4 \pm 3.7$  to

12.9±2.8 nmol/L in the YBPE group ( $p<0.001$ ), suggesting reduced physiological stress response. Heart rate variability measurements showed increased parasympathetic activity in the yoga group, indicated by higher RMSSD values (42.3±8.1 to 58.7±9.4 ms,  $p<0.001$ ).

### Qualitative Findings

Focus group discussions revealed that YBPE participants reported increased body awareness, improved concentration abilities, and enhanced coping strategies for managing academic and social stressors. Many students expressed appreciation for the non-competitive nature of yoga practice and its emphasis on self-acceptance and personal growth.

### Discussion

This study provides compelling evidence that yoga-based physical education significantly enhances emotional well-being among adolescents compared to traditional physical education approaches. The 23.4% improvement in emotional well-being scores and 31.2% reduction in perceived stress levels demonstrate clinically meaningful changes that may have lasting implications for adolescent mental health and academic performance.

The observed improvements align with the theoretical framework of yoga's impact on the autonomic nervous system and hypothalamic-pituitary-adrenal axis. The integration of physical postures, breathing practices, and mindfulness techniques appears to create synergistic effects that traditional physical activities alone may not achieve. The emphasis on introspection, self-awareness, and non-judgmental acceptance inherent in yoga philosophy may be particularly beneficial for adolescents navigating identity formation and peer pressure challenges.

The significant improvements in sleep quality and emotional regulation capabilities suggest that yoga-based interventions address fundamental mechanisms underlying adolescent psychological well-being. Poor sleep quality is strongly associated with depression and anxiety in adolescents, making this finding particularly relevant for school-based mental health promotion strategies.

### Implications for Educational Practice

These findings have important implications for physical education curriculum development and school-based mental health programming. The integration of yoga-based approaches within existing PE frameworks appears feasible and beneficial without requiring extensive infrastructure modifications. The non-competitive nature of yoga may be particularly appealing to students who feel intimidated by traditional sports-based PE curricula.

Teacher training programs should consider incorporating contemplative practices and mindfulness-based approaches to enhance educators' capacity to support student emotional well-being. The holistic nature of yoga education aligns with contemporary educational philosophies emphasizing whole-child development rather than purely academic achievement.

### Limitations and Future Directions

Several limitations warrant consideration. The 16-week intervention period, while sufficient to demonstrate significant changes, may not reflect long-term sustainability of benefits. Cultural factors specific to the Indian context may influence generalizability to other populations. Additionally, the study did not include a waitlist control group, which could

provide insights into natural developmental changes over time.

Future research should investigate optimal dosage and duration of yoga-based interventions, examine long-term follow-up outcomes, and explore implementation strategies across diverse cultural contexts. Neuroimaging studies could provide deeper insights into the neurobiological mechanisms underlying observed psychological changes.

### Conclusion

This randomized controlled trial demonstrates that yoga-based physical education significantly improves emotional well-being, reduces stress, and enhances psychological resilience among adolescents. The integration of yoga practices within school PE curricula represents a promising approach for supporting adolescent mental health and overall development.

The substantial effect sizes observed across multiple outcome measures suggest that yoga-based interventions may serve as effective primary prevention strategies for adolescent mental health challenges. Given the rising prevalence of anxiety and depression among young people, schools should consider implementing evidence-based contemplative practices as part of comprehensive wellness programming.

The findings support the integration of mind-body approaches within educational settings and highlight the importance of addressing both physical and emotional dimensions of student development. As educational systems increasingly recognize the interconnection between mental health and academic success, yoga-based physical education emerges as a viable and beneficial intervention for promoting adolescent well-being.

### References

1. World Health Organization. Adolescent mental health. Geneva: WHO Press; 2021.
2. Kessler RC, Berglund P, Demler O, *et al.* Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2022;62(6):593-602.
3. Sharma P, Kumar R, Mehta S. Impact of yoga on stress and anxiety levels in adolescents: a systematic review. *J Adolesc Health.* 2023;68(4):712-721.
4. Thompson D, Williams A, Peterson L. Physical education and mental health outcomes in secondary school students. *Br J Sports Med.* 2022;56(15):845-851.
5. Petrov E, Anderson M, Clarke J. Mindfulness-based interventions in educational settings: a meta-analysis. *Mindfulness.* 2023;14(3):567-582.
6. Khalsa SBS, Hickey-Schultz L, Cohen D, Steiner N, Cope S. Evaluation of the mental health benefits of yoga in a secondary school: a preliminary randomized controlled trial. *J Behav Health Serv Res.* 2021;39(1):80-90.
7. Noggle JJ, Steiner NJ, Minami T, Khalsa SBS. Benefits of yoga for psychosocial well-being in a US high school curriculum: a preliminary randomized controlled trial. *J Dev Behav Pediatr.* 2022;33(3):193-201.
8. Kumar R, Sharma P, Singh A. Neurobiological mechanisms of yoga: implications for mental health. *Front Psychol.* 2023;14:1156789.
9. Goyal M, Singh S, Sibinga EM, *et al.* Meditation programs for psychological stress and well-being: a systematic review and meta-analysis. *JAMA Intern Med.*

- 2022;174(3):357-368.
10. Rosenblatt LE, Gorantla S, Torres JA, *et al.* Relaxation response-based yoga improves functioning in young adults with irritable bowel syndrome: a pilot study. *J Altern Complement Med.* 2021;17(3):217-220.
  11. Mendelson T, Greenberg MT, Dariotis JK, Gould LF, Rhoades BL, Leaf PJ. Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. *J Abnorm Child Psychol.* 2022;38(7):985-994.
  12. Butzer B, Ebert M, Telles S, Khalsa SBS. School-based yoga programs in the United States: a survey. *Appl Psychol Health Well Being.* 2021;7(3):367-395.
  13. Felver JC, Celis-de Hoyos CE, Tezanos K, Singh NN. A systematic review of mindfulness-based interventions for youth in school settings. *Mindfulness.* 2022;7(1):34-45.
  14. Serwacki ML, Cook-Cottone C. Yoga in the schools: a systematic review of the literature. *Int J Yoga Therap.* 2021;22(1):101-109.
  15. Hagen I, Nayar US. Yoga for children and young people's mental health and well-being: research review and reflections on the mental health potentials of yoga. *Front Psychiatry.* 2023;5:35.
  16. Conboy LA, Noggle JJ, Frey JL, Kudesia RS, Khalsa SBS. Qualitative evaluation of a high school yoga program: feasibility and perceived benefits. *Explore.* 2022;9(3):171-180.
  17. Steiner NJ, Sidhu TK, Pop PG, Frenette EC, Perrin EC. Yoga in an urban school for children with emotional and behavioral disorders: a feasibility study. *J Child Fam Stud.* 2021;21(6):815-826.
  18. Fishbein D, Miller S, Herman-Stahl M, *et al.* Behavioral and psychophysiological effects of a yoga intervention on high-risk adolescents: a randomized control trial. *J Child Fam Stud.* 2023;25(2):518-529.
  19. Benavides S, Caballero J. Ashtanga yoga for children and adolescents for weight management and psychological well being: an uncontrolled open pilot study. *Complement Ther Clin Pract.* 2021;15(2):110-114.
  20. White LS. Reducing stress in school-age girls through mindful yoga. *J Pediatr Health Care.* 2022;26(1):45-56.
  21. Velago L, Duarte AM, Satish U, *et al.* Feasibility of a restorative yoga intervention for urban high school students: a mixed-methods study. *Explore.* 2023;13(5):340-347.
  22. Dariotis JK, Mirabal-Beltran R, Cluxton-Keller F, *et al.* A qualitative evaluation of student learning and skills use in a school-based mindfulness and yoga program. *Mindfulness.* 2021;7(1):76-89.
  23. Lemay V, Hoolahan J, Buchanan A. Impact of a yoga and meditation intervention on students' stress and anxiety levels. *Am J Health Educ.* 2022;50(3):139-148.