

INPLASY

The Somatic Anchoring Effect: A Systematic Review and Meta-Analysis of Yoga-Based Interventions for Stress and Mental Health in College Students

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ADMINISTRATIVE INFORMATION**Support** - No support.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2026100074**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 October 2026 and was last updated on 16 October 2026.**INTRODUCTION**

Review question / Objective To determine the effectiveness of yoga-based interventions—including asana-based practices, pranayama (breathing techniques), meditation/mindfulness, or integrated approaches combining two or more of these components—on stress, anxiety, depression, and related psychological outcomes (mindfulness, psychological well-being, sleep) and physiological markers (heart rate variability, salivary cortisol, heart rate, blood pressure) in undergraduate college or university students, compared with passive (waitlist, no treatment, treatment as usual) or active (alternative exercise, relaxation, psychoeducation) control conditions, as evaluated in randomised controlled trials; and to examine whether intervention type, delivery mode (in-person, online, hybrid), and program duration moderate these effects.

Condition being studied Mental health conditions in college and university students, including perceived stress, anxiety, and depression, as well as related psychological outcomes such as psychological distress, low mindfulness, poor sleep, and impaired psychological well-being, with physiological stress markers (e.g., heart rate variability, salivary cortisol) as secondary aspects of interest.

METHODS

Search strategy Search terms will combine keywords and MeSH terms covering the PICO components. Population: "college students", "university students", "undergraduate*"; Intervention: "yoga", "yogic", "asana", "pranayama", "meditation", "mindfulness"; Comparator: "control", "waitlist", "waiting list", "treatment as usual", "active control"; Outcomes: "stress", "anxiety", "depression", "psychological distress", "well-being", "sleep", "heart rate variability", "cortisol". A representative PubMed

search string: (("yoga" OR "yogic" OR "asana" OR "pranayama" OR "meditation" OR "mindfulness") AND ("college students" OR "university students" OR "undergraduate*") AND ("stress" OR "anxiety" OR "depression" OR "psychological distress" OR "well-being" OR "heart rate variability" OR "cortisol")). The strategy will be adapted for each database: PubMed, Web of Science, Cochrane Central Register of Controlled Trials (CENTRAL), PsycINFO, and Scopus, searched from database inception to June 30, 2026, with no restrictions on publication date.

Participant or population Undergraduate students enrolled in a college or university, regardless of academic discipline, year of study, or baseline stress/anxiety level. Studies targeting clinical populations (e.g., patients diagnosed with anxiety or depressive disorders) or non-student adults are excluded.

Intervention The interventions of interest are structured yoga-based interventions, including asana-based practices (e.g., Hatha, Vinyasa, Iyengar), pranayama or breathing techniques (e.g., Nadi Shodhana, Kapalabhati, Bhramari), meditation/mindfulness-based practices, or integrated approaches combining two or more of these components. No restrictions are placed on intervention duration, frequency, session length, or delivery mode (in-person, online, or hybrid).

Comparator Comparator conditions include passive control (waitlist, no intervention, treatment as usual) and active control (e.g., alternative exercise, relaxation training, psychoeducation, or other structured non-yoga activities).

Study designs to be included Randomised controlled trials (RCTs) comparing yoga-based or mindfulness-based interventions against passive or active control conditions in college students.

Eligibility criteria Additional inclusion criteria: (1) studies must provide sufficient quantitative data (sample sizes, means, and standard deviations) to calculate effect sizes; (2) at least one prespecified outcome measure (stress, anxiety, depression, psychological distress, mindfulness, psychological well-being, sleep, cognitive function, or physiological markers such as heart rate variability, cortisol, heart rate, blood pressure) must be reported; (3) only peer-reviewed published studies are considered.

Information sources The following electronic databases will be searched from database inception to June 30, 2026: PubMed, Web of

Science, Cochrane Central Register of Controlled Trials (CENTRAL), PsycINFO, and Scopus. Forward and backward citation searching of included studies and previous systematic reviews will additionally be performed. No restrictions on publication date will be applied.

Main outcome(s) Primary outcomes: stress, anxiety, and depression, measured with validated self-report scales (e.g., Perceived Stress Scale, State-Trait Anxiety Inventory, Beck Anxiety Inventory, GAD-7, DASS-21) or objective physiological markers (e.g., heart rate variability, salivary cortisol). Secondary outcomes: psychological distress, mindfulness, psychological well-being, sleep, cognitive function, and physiological markers (heart rate variability, cortisol, heart rate, blood pressure, respiratory rate, EEG). Outcomes are assessed at post-intervention time points. Effect sizes are calculated as standardized mean differences (Hedges' *g*) with 95% confidence intervals, pooled using a random-effects model.

Quality assessment / Risk of bias analysis Risk of bias will be assessed in all included randomised controlled trials using the Cochrane Risk of Bias 2 (RoB-2) tool, covering the domains of randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Two independent reviewers will assess each study, with disagreements resolved through discussion or, if consensus cannot be reached, by consultation with a third reviewer.

Strategy of data synthesis Meta-analyses will be performed using a restricted maximum likelihood (REML) random-effects model, given the anticipated methodological and clinical heterogeneity. Effect sizes will be computed as standardized mean differences (Hedges' *g*) with 95% confidence intervals; only outcomes with at least three independent effect sizes ($k \geq 3$) will be pooled. Heterogeneity will be quantified using the I^2 statistic. Subgroup analyses will be conducted to examine the moderating effects of intervention type (integrated yoga vs. meditation-only), delivery mode (technology-aided vs. in-person), and program duration (short-term ≤ 8 weeks vs. long-term > 8 weeks), with between-group differences tested using the QM statistic.

Subgroup analysis Planned subgroup analyses will examine whether treatment effects differ by: (1) intervention type — integrated yoga (combining asana, pranayama, and meditation) vs. meditation/mindfulness-only protocols; (2) delivery mode —

technology-aided (online/digital) vs. in-person delivery; and (3) program duration – short-term (≤ 8 weeks) vs. long-term (> 8 weeks). Between-group differences will be tested using the QM statistic.

Sensitivity analysis To assess the robustness of the pooled effect estimates, the following sensitivity analyses will be performed: (1) excluding studies rated at high risk of bias; (2) repeating the meta-analyses using an alternative model (e.g., fixed-effects model) or an alternative effect measure; and (3) conducting leave-one-out analyses (omitting one study at a time) to examine the influence of individual studies on the overall estimates.

Country(ies) involved China, USA.

Keywords yoga; mindfulness; meditation; stress; anxiety; depression; college students; mental health; systematic review; meta-analysis; randomized controlled trial.

Contributions of each author

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