



Effect of yoga-based intervention on stress, sleep quality, and psychological well-being among college students

Alka

Assistant Professor, Department of Yoga Science, Tika Ram Girls College, Sonipat, Haryana, India

DOI: <https://doi.org/10.66856/ijyppe.2026.11.3.11066>

Abstract

College students frequently experience academic pressure, financial concerns, social adjustment, and uncertainty about the future. These stressors may contribute to poor sleep quality and reduced psychological well-being. Yoga-based interventions combine physical postures, breathing exercises, relaxation, and mindfulness, and may provide a low-cost strategy for supporting student health. This paper examines the potential effects of a structured yoga-based intervention on perceived stress, sleep quality, and psychological well-being among college students. A proposed quasi-experimental research design is presented, including the study objectives, methodology, measurement instruments, intervention protocol, data-analysis plan, ethical considerations, and expected findings. The proposed study is expected to determine whether regular yoga practice can reduce stress, improve sleep, and enhance psychological well-being in university students.

Keywords: Yoga, college students, stress, sleep quality, psychological well-being, mindfulness, health promotion

Introduction

College students encounter several academic and psychosocial demands, including examinations, assignment deadlines, competition, interpersonal challenges, financial limitations, and adaptation to independent living. Persistent exposure to these demands can produce psychological stress. Although short-term stress may support motivation, prolonged or poorly managed stress can negatively affect concentration, emotional regulation, physical health, and academic performance.

Sleep is another important concern among college students. Irregular schedules, prolonged screen exposure, late-night studying, social activities, and anxiety may reduce sleep duration and quality. Poor sleep is associated with daytime fatigue, impaired attention, emotional instability, and reduced academic functioning.

Psychological well-being refers to positive functioning that includes emotional balance, self-acceptance, purpose in life, positive relationships, autonomy, and the ability to manage environmental demands. Stress and poor sleep may undermine these dimensions. Therefore, accessible interventions that address both physiological and psychological functioning are important in university settings.

Yoga-based intervention is a mind-body approach involving physical postures, regulated breathing, relaxation, and attentional practices. Regular yoga practice may reduce physiological arousal, improve body awareness, support emotional regulation, and promote healthier sleep patterns. However, the effectiveness of yoga may depend on the duration, frequency, structure, and adherence to the intervention.

This research paper proposes a study to assess the effect of a structured yoga-based intervention on stress, sleep quality, and psychological well-being among college students.

Background and Rationale

1. Stress among college students

Stress can be understood as a psychological and physiological response to perceived demands that exceed an

individual's available coping resources. College students may experience stress from:

- Academic workload and examinations
- Fear of failure or poor academic performance
- Financial difficulties
- Relationship and family concerns
- Social comparison
- Career uncertainty
- Adjustment to a new environment

High stress may be associated with headaches, muscle tension, irritability, reduced concentration, anxiety, and emotional exhaustion.

2. Sleep quality

Sleep quality includes more than the total number of hours slept. It also involves sleep onset, nighttime awakenings, sleep efficiency, subjective restfulness, and daytime functioning. Students who experience stress may have difficulty falling asleep or may wake frequently during the night. In turn, inadequate sleep may increase emotional reactivity and reduce the ability to cope with daily stressors.

3. Psychological well-being

Psychological well-being is a multidimensional construct. It includes positive affect, life satisfaction, emotional stability, self-confidence, social functioning, and a sense of meaning. Activities that encourage present-moment awareness and nonjudgmental self-observation may contribute to improvements in psychological well-being.

4. Yoga as a health-promoting intervention

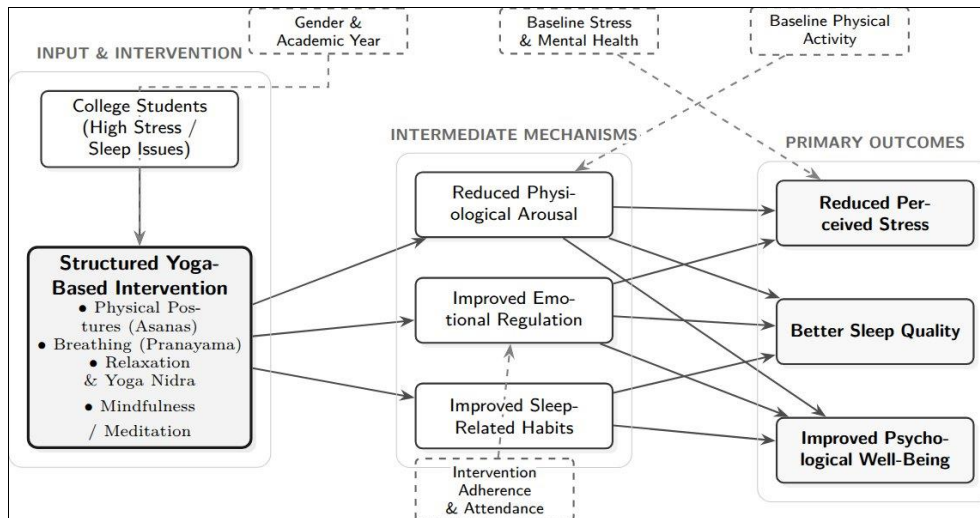
Yoga may influence stress and well-being through several pathways:

1. Slow breathing may increase parasympathetic activity.
2. Physical postures may reduce muscular tension.
3. Mindfulness may reduce repetitive negative thinking.
4. Relaxation practices may lower pre-sleep arousal.
5. Regular practice may improve self-regulation and body awareness.

The proposed study is justified because yoga is relatively inexpensive, requires limited equipment, and can be implemented in colleges through group sessions or digital instruction.

Conceptual Framework

The proposed framework assumes that participation in a regular yoga program influences stress, sleep quality, and psychological well-being through physiological, behavioral, and psychological mechanisms.



Yoga practice → reduced physiological arousal
 → improved emotional regulation
 → better sleep-related behavior
 → {lower perceived stress,
 higher sleep quality,
 greater psychological well-being.

1. Variables

- **Independent variable:** Participation in a structured yoga-based intervention
- **Dependent variables:** Perceived stress, sleep quality, and psychological well-being
- **Potential covariates:** Age, gender, academic year, baseline physical activity, prior yoga experience, medication use, and intervention adherence

Research Objectives

The study will pursue the following objectives:

1. To determine whether a structured yoga-based intervention reduces perceived stress among college students.
2. To examine whether the intervention improves sleep quality.
3. To assess whether the intervention improves psychological well-being.
4. To examine the relationship between intervention adherence and changes in the outcome variables.
5. To determine whether changes in sleep quality are associated with changes in perceived stress and psychological well-being.

Research Questions

1. Does participation in a yoga-based intervention reduce perceived stress among college students?
2. Does participation in the intervention improve subjective sleep quality?
3. Does the intervention enhance psychological well-being?
4. Is greater attendance associated with greater improvement in study outcomes?

Hypotheses

The following hypotheses may be tested:

- **H1:** Students who participate in the yoga-based intervention will demonstrate lower post-intervention stress scores than students in the comparison group.
- **H2:** Students who participate in the intervention will demonstrate improved sleep-quality scores relative to baseline.
- **H3:** Students who participate in the intervention will demonstrate higher psychological well-being scores after the intervention.
- **H4:** Intervention adherence will be positively associated with improvements in sleep quality and psychological well-being.
- **H5:** Improvements in sleep quality will be associated with reductions in perceived stress.

Methodology

1. Research design

A quasi-experimental, pretest-posttest design with a comparison group is recommended. If random allocation is feasible, a randomized controlled trial would provide stronger evidence of causality.

Participants would be assessed at three time points:

1. **T1:** Baseline assessment before the intervention
2. **T2:** Assessment immediately after the intervention
3. **T3:** Follow-up assessment approximately four weeks later

The comparison group would continue its usual activities during the intervention period and may be offered yoga sessions after the study concludes.

2. Participants

The target population would consist of undergraduate and postgraduate students enrolled at a college or university.

Inclusion criteria

- Enrolled as a college or university student

- Within the predetermined age range
- Able to participate in light-to-moderate physical activity
- Willing to attend yoga sessions regularly
- Able to provide informed consent

Exclusion criteria

- Current severe physical injury that prevents participation
- Medical restriction against light physical activity
- Current participation in a structured yoga program
- Severe psychiatric or medical conditions requiring immediate specialist treatment

Students should not be excluded from professional support because of participation in the study. Participants reporting severe distress, suicidal thoughts, or serious sleep problems should be referred to qualified health professionals.

3. Sample and sampling procedure

A sample may be recruited through campus announcements, electronic messages, classroom notices, and student

organizations. A formal sample-size calculation should be conducted before data collection using the expected effect size, desired statistical power, significance level, and anticipated attrition.

Participants may be assigned to:

- An intervention group receiving structured yoga sessions
- A comparison group receiving usual activities or health-education material

If randomization is not possible, matching or statistical adjustment may be used to reduce baseline differences between groups.

Yoga-Based Intervention Protocol

The proposed intervention may last **8 weeks**, with three supervised sessions per week. Each session may last approximately **45 to 60 minutes**.

1. Session structure

Component	Approximate duration	Content
Centering and intention setting	5 minutes	Comfortable sitting and attention to breathing
Breathing exercises	10 minutes	Slow diaphragmatic breathing and alternate-nostril breathing, when appropriate
Physical postures	25 minutes	Gentle standing, seated, balancing, and stretching postures
Relaxation	10 minutes	Guided body relaxation or supine rest
Mindfulness practice	5 minutes	Nonjudgmental observation of thoughts and sensations
Closing	5 minutes	Reflection and home-practice instructions

2. Safety procedures

The intervention should be delivered by a qualified instructor. Students should be instructed to:

- Avoid forcing or bouncing during stretching
- Stop if they experience pain, dizziness, chest discomfort, or breathing difficulty
- Modify postures according to individual ability
- Inform the instructor about relevant medical conditions
- Avoid treating yoga as a replacement for medical or psychological care

3. Home practice

Participants may be encouraged to complete an additional 10 to 15 minutes of guided home practice on non-session days. Attendance and home-practice frequency should be recorded in an intervention log.

Measurement Instruments

1. Perceived stress

Perceived stress may be measured with the Perceived Stress Scale, which assesses the extent to which situations are experienced as unpredictable, uncontrollable, or overwhelming. Higher scores indicate greater perceived stress.

2. Sleep quality

Sleep quality may be assessed using the **Pittsburgh Sleep Quality Index**. This instrument evaluates subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Higher global scores generally indicate poorer sleep quality.

3. Psychological well-being

Psychological well-being may be measured using a validated well-being scale, such as the Warwick-Edinburgh Mental Well-being Scale or a multidimensional psychological well-being instrument. The selected scale should be appropriate for the study population and available in a validated language version.

4. Demographic and behavioral information

The questionnaire may include:

- Age
- Gender
- Academic year
- Field of study
- Living arrangement
- Average daily screen time
- Physical activity
- Caffeine consumption
- Prior yoga experience
- Use of sleep medication or mental-health services

Proposed Data-Collection Procedure

1. Obtain approval from the institutional ethics committee.
2. Recruit eligible students.
3. Explain the study and obtain written informed consent.
4. Collect baseline demographic and outcome data.
5. Assign participants to the intervention or comparison group.
6. Deliver the yoga program for eight weeks.
7. Record attendance and adverse events.
8. Conduct post-intervention assessment.
9. Conduct follow-up assessment.

10. Analyze and report the findings without identifying individual participants.

Data-Analysis Plan

Data should first be screened for missing values, outliers, and violations of statistical assumptions. Descriptive statistics should summarize participant characteristics and baseline outcome scores.

The primary analysis may use a repeated-measures model or a mixed-effects model to compare changes over time between groups.

For each outcome, the model may be represented as:

$$Y_{ij} = \beta_0 + \beta_1 \text{Group}_i + \beta_2 \text{Time}_j + \beta_3 (\text{Group}_i \times \text{Time}_j) + u_i + \epsilon_{ij}$$

where:

- Y_{ij} is the outcome score for participant i at time j ;
- β_0 is the intercept;
- β_1 represents the group effect;
- β_2 represents the time effect;
- β_3 represents the group-by-time interaction;
- u_i represents participant-level variation;
- ϵ_{ij} represents residual error.

The group-by-time interaction is particularly important because it tests whether the intervention group changes differently from the comparison group.

Additional analyses may include:

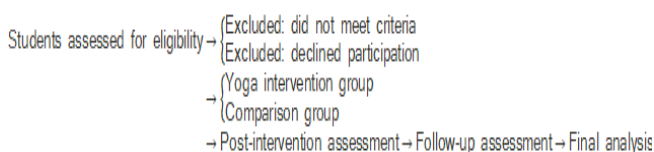
- Independent-samples comparisons of post-intervention scores
- Within-group pretest-posttest comparisons
- Correlation between attendance and outcome changes
- Effect-size estimation
- Sensitivity analysis using intention-to-treat principles
- Adjustment for baseline scores and relevant covariates

Statistical significance should not be interpreted without reporting confidence intervals and effect sizes.

Required Diagrams and Graphs

1. Study-flow diagram

Suggested structure:



2. Expected outcome graph

The following graph is an **illustrative template**, not a presentation of actual study results.

[Visualization]

3. Illustrative data table for graph preparation

The values below are hypothetical and should not be reported as empirical findings.

Outcome	Group	Baseline	Week 4	Week 8	Follow-up
Perceived stress	Yoga	Illustrative	Illustrative	Illustrative	Illustrative
Perceived stress	Comparison	Illustrative	Illustrative	Illustrative	Illustrative
Sleep-quality score	Yoga	Illustrative	Illustrative	Illustrative	Illustrative
Sleep-quality score	Comparison	Illustrative	Illustrative	Illustrative	Illustrative
Psychological well-being	Yoga	Illustrative	Illustrative	Illustrative	Illustrative
Psychological well-being	Comparison	Illustrative	Illustrative	Illustrative	Illustrative

The direction of interpretation must match the selected instruments. For example, if a sleep-quality scale assigns higher scores to poorer sleep, a decrease represents improvement.

Expected Results

The expected findings are that students receiving the yoga intervention will report:

1. Lower perceived stress after the intervention.
2. Reduced sleep difficulties and improved subjective sleep quality.
3. Higher psychological well-being.
4. Greater improvement among students with higher attendance and regular home practice.
5. Partial maintenance of benefits at follow-up.

The magnitude of improvement may differ according to baseline stress, pre-existing sleep problems, academic workload, physical activity, and adherence to the intervention.

Because the present paper proposes a study design, numerical results should not be fabricated. Actual means, standard deviations, confidence intervals, effect sizes, and p -values should be inserted only after data collection and analysis.

Discussion

If the proposed hypotheses are supported, the results would suggest that yoga can be used as an adjunctive health-promotion strategy for college students. A reduction in stress may occur because yoga combines movement, controlled breathing, relaxation, and mindful attention. These practices may reduce excessive physiological activation and improve the ability to regulate emotional responses.

Improved sleep may result from reduced cognitive arousal before bedtime, improved relaxation, greater body awareness, and more consistent daily routines. However, yoga should not be considered a complete solution for sleep problems caused by untreated medical conditions, severe anxiety, depression, substance use, or environmental difficulties.

Improved psychological well-being may reflect increased self-awareness, acceptance, perceived competence, and social connection during group practice. Group-based yoga may also provide a structured opportunity for students to engage in healthy behavior with peers.

The intervention may be particularly valuable in colleges because it can be implemented in classrooms, wellness centers, residence halls, or online environments. Nevertheless, accessibility must be considered. Some

students may have physical limitations, cultural concerns, schedule conflicts, or discomfort with certain forms of yoga. The program should therefore use inclusive language and offer appropriate modifications.

Limitations

Several limitations should be considered:

- Self-report instruments may be influenced by recall or response bias.
- Participants who volunteer may already be more interested in health practices.
- Lack of blinding is likely in behavioral interventions.
- Attendance and home practice may vary considerably.
- A short follow-up period may not establish long-term effectiveness.
- Academic events, examinations, and seasonal factors may affect stress and sleep.
- Results from one institution may not generalize to all college students.
- The intervention may be difficult to separate from other lifestyle changes occurring during the study.

Future studies could use wearable sleep monitors, longer follow-up periods, multicampus samples, and comparisons with other interventions such as aerobic exercise, mindfulness training, or counseling.

Ethical Considerations

The study should receive approval from the relevant institutional ethics committee. Participants should receive clear information about the purpose, procedures, possible benefits, and potential risks. Participation must be voluntary, and students should be free to withdraw without academic or personal consequences.

Personal information and questionnaire responses should be stored securely. Results should be reported in aggregate form. Any participant showing severe psychological distress or serious sleep-related impairment should be provided with appropriate referral information.

Conclusion

A structured yoga-based intervention may offer a practical and accessible approach to improving college students' stress management, sleep quality, and psychological well-being. The proposed eight-week program combines physical postures, breathing exercises, relaxation, and mindfulness. A controlled pretest-posttest design with follow-up assessment would allow researchers to examine both immediate and sustained effects.

The study should report actual numerical findings only after data collection and statistical analysis. If supported by empirical evidence, yoga could be incorporated into college wellness programs as a complementary strategy alongside counseling, medical care, sleep education, and other evidence-based services.

References

1. American College Health Association. National College Health Assessment III: Undergraduate student reference group executive summary. American College Health Association, 2023.
2. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *Journal of Health and Social Behavior*, 1983;24(4):385–396.

3. Kabat-Zinn J. *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. Delacorte, 1990.
4. Kessler RC, Berglund PA, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 2005;62(6):593–602.
5. Murray MT, Pizzorno J. *The encyclopedia of natural medicine*. Atria Books, 2012.
6. Pilkington K, Kirkwood G, Rampes H, Richardson J. Yoga for anxiety: A systematic review of the research. *British Journal of Sports Medicine*, 2005;39(12):884–891.
7. Rosenberg RS, Van Hout S. The American Academy of Sleep Medicine and sleep health. *Journal of Clinical Sleep Medicine*, 2015;11(11):1255–1256.
8. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 1989;57(6):1069–1081.
9. Sivaramakrishnan D, Fitzsimons C, Kelly P, Ludwig K, Mutrie N, Saunders DH, Baker G, Brennan G. The effects of yoga compared with active and inactive controls on physical function and health-related quality of life in older adults. *Cochrane Database of Systematic Reviews*, 2019;2019(10):CD010671.
10. World Health Organization. WHO guidelines on physical activity and sedentary behaviour. World Health Organization, 2020.