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Evaluating the efficacy of yoga intervention in reducing anxiety among college students: A pre-post experimental study in Jaipur

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Abstract

Mental health concerns among college students have surged in recent years, with anxiety emerging as one of the most prevalent issues. In urban academic settings like Jaipur, increasing academic pressure, digital stress, and career uncertainty contribute significantly to elevated anxiety levels among youth. While pharmacological interventions are available, there is growing interest in holistic, non-invasive alternatives such as yoga. Rooted in ancient Indian traditions, yoga integrates physical, mental, and spiritual practices and is widely recognized for its stress-relieving and mind-calming effects. The present study investigates the effectiveness of a structured yoga intervention in reducing anxiety among college students in Jaipur.

The study was conducted on a stratified sample of 250 undergraduate and postgraduate students from various academic streams and colleges in Jaipur. A pre-test post-test quantitative research design was adopted. Data were collected using the Beck Anxiety Inventory (BAI) before and after a 6-week yoga intervention program that included asanas, pranayama, and meditation. A pilot study ensured feasibility and reliability of the tool. Statistical techniques including paired sample t-tests, regression analysis, and gender-based comparisons were employed using SPSS.

The findings revealed a statistically significant reduction in anxiety scores, with the average score decreasing from 69.98 (pre-intervention) to 59.90 (post-intervention). The paired t-test yielded a t-value of 19.84 ($p < 0.001$), confirming the effectiveness of the intervention. Regression analysis showed a high predictive value ($R^2 = 0.792$) of pre-scores on post-scores, indicating that students with higher baseline anxiety benefited the most. Gender-based analysis showed slightly higher reductions among female students, but this difference was not statistically significant ($p > 0.05$), supporting the hypothesis that yoga is equally effective across genders.

In conclusion, the study affirms that yoga is an effective, low-cost, and inclusive intervention for reducing anxiety among college students. It supports the integration of yoga-based mental health modules within higher education frameworks. Based on these outcomes, the paper recommends: (1) institutionalizing yoga sessions in college curricula, (2) setting up campus wellness centers, (3) incorporating regular mental health screenings, (4) training peer mentors and faculty in basic yoga, and (5) collaborating with national wellness agencies for standardized program delivery. These steps can holistically support students' mental well-being and academic success.

Keywords: Yoga Intervention; College Students; Pranayam; Anxiety; Depression; Mental Stress; Jaipur; Students

1. Introduction

Mental health challenges among college students have emerged as a critical concern in recent years, globally and in India [1]. Academic workloads, peer competition, financial burdens, and career uncertainties significantly contribute to

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psychological distress in this population [2-3]. Among various mental health issues, anxiety disorders are particularly prevalent. According to the World Health Organization (2021), approximately 264 million people suffer from anxiety globally, with a substantial proportion being university students [4]. This demographic is at a vulnerable stage, grappling with academic, personal, and social transitions, which can exacerbate stress and anxiety levels [5-6].

In the Indian context, urban centers like Jaipur have witnessed a marked rise in anxiety symptoms among youth. Students here often face intense academic expectations, social comparison, and increasing digital engagement, all of which can heighten psychological strain [7]. Moreover, limited availability of counseling support in Indian colleges and the stigma associated with mental health further restrict students from seeking professional help. This calls for more culturally congruent, holistic, and preventive mental health strategies that are both effective and acceptable to the student population [8-9].

Yoga, an ancient Indian discipline, is increasingly being recognized globally as a viable complementary intervention for mental health [10]. It integrates physical postures (asanas), controlled breathing techniques (pranayama), and meditation (dhyana) to promote harmony between body and mind [11]. Several scientific studies have established that yoga can reduce stress hormones like cortisol, improve parasympathetic activity, and enhance emotional regulation. These physiological changes are directly linked to reduced anxiety levels and improved psychological well-being [12].

Research has consistently shown that yoga fosters greater mindfulness and cognitive flexibility, which can help students manage academic pressures more effectively. For example, a study by Elstad, T et al. [13] demonstrated significant reductions in anxiety and depression among college students following an 8-week yoga intervention. Importantly, these effects were sustained even after the intervention, suggesting the long-term benefits of regular practice.

Colleges across India are beginning to recognize the utility of yoga in supporting student well-being. Institutions such as Delhi University and Banaras Hindu University have started including yoga sessions in their orientation and wellness programs [14-15]. However, structured empirical evaluations of these initiatives remain scarce, particularly in tier-2 cities like Jaipur where academic competitiveness is high, but mental health infrastructure is often lacking. Therefore, more localized studies are needed to assess yoga's actual effectiveness in real-world college settings [16].

Jaipur, as a culturally rich and educationally vibrant city, offers an ideal landscape for such research [17]. It hosts a wide spectrum of students from rural and urban backgrounds studying in engineering, management, arts, and science colleges [18]. This diversity allows for a broader understanding of how yoga impacts students across academic streams and social demographics. Moreover, Rajasthan's cultural receptivity to yoga ensures higher compliance and interest among participants [19-20].

Prevalence studies in India indicate that approximately 30–40% of college students experience moderate to severe levels of anxiety. Despite this, utilization of mental health services remains low due to stigma, lack of awareness, and insufficient institutional support. Yoga, being a culturally familiar and socially acceptable practice, holds the potential to bridge this treatment gap. It does not carry the same stigma as psychiatric consultation and can be practiced in group settings, making it more accessible and engaging [21].

Furthermore, yoga interventions not only reduce anxiety but also improve concentration, self-discipline, and self-esteem factors that can contribute positively to academic performance and peer relationships [22]. For college students, especially in a transitional phase of identity and career development, these outcomes can lead to overall holistic growth. Yoga thus presents itself not merely as a mental health intervention but as a comprehensive life skill education model [23].

Given the rising burden of anxiety and the growing interest in alternative therapies, there is a pressing need to empirically validate the role of yoga in college settings [24]. While studies abroad have shown promising results, more data from Indian educational institutions are required to formulate contextually relevant wellness policies. Additionally, understanding the gender-specific outcomes and responses to yoga practice can help in designing more targeted interventions [25].

In this light, the present study aims to evaluate the effectiveness of a structured yoga intervention in reducing anxiety levels among college students in Jaipur. Using a pre-post intervention design with a sample of 250 students, this research not only investigates the overall impact of yoga on anxiety but also explores any gender-based differences in outcomes. The results of this study will have important implications for institutional mental health strategies and student support policies in Indian higher education.

2. Review of literature

The increasing prevalence of anxiety among college students has become a global concern, leading to a growing interest in evidence-based, non-pharmacological interventions such as yoga. The literature consistently highlights yoga's capacity to reduce anxiety, enhance emotional well-being, and foster mindfulness among student populations across diverse contexts and geographies.

Sengupta, P et al. [26] conducted a systematic review examining yoga's role in reducing state anxiety and found consistent improvements across multiple studies. However, they noted methodological variations that limited the generalizability of findings, establishing a foundation for more standardized, controlled research in later years. Expanding on these findings, Shapiro, D et al. [27] evaluated a short-term yoga intervention among medical students and reported significant improvements in GHQ-28 scores, demonstrating both the feasibility and psychological benefits of incorporating yoga into academic curricula. Similarly, Sharma, M et al. [28] conducted a randomized controlled trial (RCT) among university students comparing yoga with a waitlist control, finding a statistically significant reduction in mental distress ($p = 0.011$ post; $p = 0.0025$ at follow-up) and improved sleep quality, confirming yoga's long-term benefits in higher education contexts.

Recent research continues to affirm these outcomes through rigorously designed interventions. Streeter, C. C et al. [29] implemented a 12-week structured yoga program among schoolboys, observing significant reductions in both anxiety ($p < 0.001$) and stress ($p = 0.004$), highlighting yoga's efficacy in youth mental health. Ta, A et al. [30] proposed pilot program further demonstrated marked improvements in depression, anxiety, and stress among medical students, validating yoga as a holistic and cost-effective mental health tool in academic settings.

Several studies have focused on specific psychological constructs influenced by yoga. A 2017 PubMed study on nursing students found improvements in mindfulness and self-compassion following an 8-week yoga intervention, though resilience and perceived stress showed nonsignificant changes indicating that yoga's impact extends beyond anxiety reduction to broader psychological well-being. Similarly, Yoga Nidra practices, reviewed in 2019, were shown to enhance self-esteem, reduce stress, and improve heart rate variability, emphasizing the physiological and psychological synergy of yogic practices.

Beyond traditional yoga, comparative and alternative interventions have also been explored. Taneja, D. K. et al. [31] utilized virtual reality (VR) simulations to reduce student anxiety and reported high perceived usefulness, demonstrating the potential of technology-assisted stress relief methods. Similarly, Telles, S et al. [32] used wearable technology under the mHELP framework to detect and reduce real-time stress in students, resulting in measurable declines in anxiety (GAD-7) and stress (PSS). While these tech-based methods show promise, they underscore the accessibility and low-cost advantage of yoga as a universally applicable intervention.

Meta-analytic and neuroimaging studies provide biological evidence supporting yoga's mental health effects. A 2016 meta-analysis identified distinct patterns of brain activation linked to meditation and yoga practices, with medium effect sizes ($d \approx 0.6–0.7$), confirming the neurological underpinnings of yoga's anxiety-reducing effects. Complementarily, Yuva School RCT Shankarapillai, R. et al. [33] revealed cognitive benefits such as enhanced memory and executive function among students following yoga training, further highlighting yoga's holistic developmental impact.

The comparative study by Yoga vs. Mindfulness RCT (2016) found that both interventions significantly reduced anxiety and stress ($p < 0.01$), while mindfulness had an additional benefit of improving self-compassion, suggesting that an integrated approach may yield multidimensional mental health benefits. Similarly, Morrow Jr, G. et al. [34] confirmed that non-pharmacological interventions like yoga and mindfulness are as effective as pharmacological treatments for mild to moderate anxiety, strengthening their credibility as primary interventions.

During and after the COVID-19 pandemic, virtual yoga gained attention for its accessibility. Verma, S et al. [35] evaluated online Kundalini Yoga among university students and found significant reductions in anxiety and stress, establishing the feasibility of remote yoga programs in crisis situations. Likewise, a Frontiers in Public Health (2024) RCT on Hatha yoga demonstrated significant improvements in state anxiety, emotional well-being, and perceived stress after a 12-week intervention involving 24 sessions, offering robust evidence that closely aligns with the design and objectives of the current study.

The systematic review on yoga interventions among nursing professionals and students concluded that yoga effectively reduces stress, anxiety, burnout, and depression, emphasizing its low-cost and scalable benefits for large populations. Woodyard, C et al. [36] in an RCT published in *Applied Psychology: Health and Well-Being*, evaluated laughter yoga among

nursing students and found notable reductions in anxiety and perceived stress, along with enhanced academic self-efficacy, suggesting that yoga-based approaches can foster both emotional regulation and academic performance.

The literature provides strong empirical and theoretical support for yoga as a powerful intervention for anxiety reduction among students. It demonstrates consistent evidence across demographics, modalities (in-person and online), and designs (pilot studies, RCTs, and meta-analyses). The findings collectively validate yoga's psychological, physiological, and academic benefits, thereby reinforcing the relevance and necessity of the current pre-post experimental study conducted among college students in Jaipur.

2.1. Research gap

Limited Empirical Studies in Indian Urban Settings: Most yoga-anxiety studies are either global or rural-focused; few target urban Indian college populations like Jaipur.

- Lack of Longitudinal or Structured Interventions: Previous research often uses short-term or unstructured yoga sessions without standardized formats and follow-ups.
- Insufficient Gender-Based Comparative Analysis: Few studies explore whether yoga's impact differs significantly across male and female student populations.
- Underrepresentation of Diverse Academic Streams: Most studies focus on medical or nursing students, ignoring students from varied academic disciplines.
- Scarcity of Statistical Rigor in Existing Studies: Many available studies use basic analysis, lacking deeper statistical evaluations like regression or gender-specific t-tests.

Given the above research gaps, there is a clear need to conduct a methodologically sound, statistically rigorous, and contextually relevant study that evaluates the effectiveness of yoga as a therapeutic intervention for anxiety among college students in Jaipur. By using a pre-post experimental design with stratified sampling across academic streams and gender groups, the current research seeks to fill these gaps and offer actionable insights into integrating yoga into institutional mental health strategies.

2.2. Problem of the study

The rapid rise in academic pressure, technological overload, and socio-emotional challenges has made anxiety a widespread mental health concern among college students in India. This demographic, poised at a critical transitional life phase, often lacks coping mechanisms to manage stress, leading to emotional exhaustion, poor academic performance, and even burnout. Despite the growing awareness around mental health, most institutional responses are reactive, relying on counselling centers that students may hesitate to approach due to stigma or lack of access. Therefore, there is a pressing need to explore preventive, accessible, and culturally acceptable alternatives that can be systematically incorporated into students' daily routines.

Yoga, as an ancient Indian mind-body discipline, offers a non-pharmacological, low-cost method to address mental distress. Recognized by global health bodies for its therapeutic potential, yoga combines physical postures, breathing regulation, and meditation to foster self-regulation, calmness, and psychological resilience. While international studies have indicated yoga's potential in reducing anxiety and improving mental well-being, there is a notable lack of structured, data-driven research within the Indian higher education context, especially in urban academic environments like Jaipur. This gap is even more significant given that youth in cities are increasingly vulnerable to anxiety due to competitive educational environments and fast-paced lifestyles.

Most existing studies are either limited to specific student groups such as medical or nursing students or are qualitative in nature, lacking robust experimental design and statistical interpretation. Furthermore, they often ignore key variables such as gender differences, academic stream variations, and pre-post comparative data using standardized anxiety measurement tools. Without a controlled intervention and a representative student sample, the actual efficacy of yoga in reducing anxiety among Indian college students remains inconclusive. Hence, there is a clear requirement for systematic, evidence-based research that can validate yoga's role in institutional mental health frameworks.

In light of these gaps, the present study aims to evaluate the impact of a structured 6-week yoga intervention on anxiety levels among a stratified sample of college students in Jaipur using a pre-test post-test design. By applying quantitative analysis methods like paired t-tests and regression, and comparing outcomes across gender and academic streams, this research seeks to fill the existing scholarly void. The findings will not only enrich academic literature but also provide practical, policy-relevant insights for integrating yoga-based wellness programs in educational institutions. Thus, the

study directly addresses a timely and socially significant research problem: How effective is yoga as a scientifically validated intervention to reduce anxiety among college students in an urban Indian context?

2.3. Research objectives

- To assess the level of anxiety among college students before and after the yoga intervention.
- To determine the effectiveness of yoga as an intervention in reducing students' anxiety.
- To compare anxiety level variations across gender and academic stream after yoga intervention.

2.4. Hypotheses

- H1: There is a significant difference in anxiety levels of college students before and after the yoga intervention.
- H2: There is no significant difference in anxiety reduction based on gender among college students after the intervention.

3. Research methodology

This section outlines the systematic approach adopted in the study titled "Analysis of Yoga Intervention on College Students' Anxiety". It includes research design, sampling methods, instrumentation, intervention details, pilot testing, and data analysis techniques used to evaluate the efficacy of yoga in alleviating anxiety among college students in Jaipur.

3.1. Research Design

The present study employed a quantitative research design, specifically a pre-test post-test experimental design without a control group. This design enabled the measurement of anxiety levels among participants both before and after the yoga intervention to assess the effectiveness of the program. Such a design is widely used in behavioral and psychological intervention studies where participants serve as their own controls (Creswell, 2014).

3.1.1. Population and Study Area

The target population consisted of undergraduate and postgraduate students from various degree colleges in Jaipur city, Rajasthan. Jaipur was selected as the study area due to its educational diversity, presence of multiple universities and colleges, and its socio-cultural receptivity to yoga. Colleges were selected to represent both government and private institutions to ensure variability across academic settings and student demographics.

3.1.2. Sample Size and Sampling Technique

A sample of 250 college students was chosen for the study. This sample size was determined based on literature guidelines for experimental studies involving psychological scales, ensuring sufficient power for statistical analysis (Cohen, 1992). The sample size was also practical for conducting the intervention sessions and follow-up within the available time frame and resources.

- Students were selected using stratified random sampling, ensuring representation across:
- Gender (approximately equal number of males and females)
- Academic streams (Arts, Commerce, Science, and Professional courses)
- Types of institutions (Government and Private colleges)

The selected colleges included

- University Maharani College
- St. Xavier’s College, Jaipur
- Kanoria PG Mahila Mahavidyalaya
- Rajasthan College
- Poornima University

Each institution facilitated the recruitment of volunteers through student wellness coordinators and college notice boards. Inclusion criteria included students aged 18–25 years, enrolled full-time, with self-reported mild to moderate anxiety. Students with diagnosed clinical anxiety disorders or on psychiatric medication were excluded.

3.1.3. Pilot Study

A pilot study was conducted on 30 students from two colleges not included in the main sample. The pilot helped in:

- Assessing the feasibility of the intervention schedule within academic timetables.
- Testing the clarity and reliability of the Standardized Anxiety Scale (in this case, the Beck Anxiety Inventory (BAI)).
- Fine-tuning instructions for participants and response formats.
- Estimating expected anxiety score variances for sample size justification.

The pilot data confirmed the internal consistency of the tool (Cronbach's alpha > 0.85), and the feasibility of implementing daily sessions for 6 weeks.

3.2. Tools for Data Collection

The main tool used for data collection was the Beck Anxiety Inventory (BAI), a widely validated self-report questionnaire consisting of 21 items rated on a 4-point Likert scale (Beck et al., 1988). It assesses the severity of anxiety symptoms, including physical, emotional, and cognitive domains. The scale was chosen for its:

- High reliability and validity
- Ease of administration among college students
- Availability of validated Hindi and English versions
- The tool was administered both at the start (pre-test) and at the end (post-test) of the intervention to all participants.

3.3. Intervention Program

The yoga intervention was designed in consultation with certified yoga therapists and tailored to college students' needs. It included

- Duration: 6 weeks (5 days/week)
- Session Length: 45 minutes per session
- Components:
- Asanas (20 mins) – including Surya Namaskar, Tadasana, Bhujangasana, Shavasana
- Pranayama (15 mins) – including Anulom Vilom, Bhramari, Kapalbhati
- Meditation (10 mins) – guided mindfulness and breath awareness

Sessions were conducted in college auditoriums or yoga halls by certified instructors affiliated with Patanjali Yogpeeth and Morarji Desai National Institute of Yoga. Attendance was recorded, and students were encouraged to maintain a journal of their experiences during the 6-week period.

3.4. Data Analysis Procedure

After the intervention, collected data were organized in Microsoft Excel and analyzed using SPSS Version 25. The following statistical tests were applied:

- Descriptive statistics: To determine the mean, standard deviation, and range of anxiety scores.
- Paired sample t-test: To assess the significance of change in anxiety scores from pre- to post-intervention (testing H1).
- Independent sample t-test: To evaluate gender-based differences in anxiety reduction (testing H2).
- Effect size (Cohen's d): To measure the strength of the intervention effect.
- All statistical tests were conducted at a 0.05 level of significance.

3.4.1. Ethical Considerations

Ethical approval was obtained from the Institutional Research Ethics Committee. Written informed consent was collected from all participants. Confidentiality of student responses was maintained, and students were informed of their right to withdraw at any point without any academic penalty.

4. Data analysis and interpretation

This section presents the descriptive and inferential statistics applied to analyze the data collected from 250 college students in Jaipur. The analysis is structured to reflect the study's objectives. Both frequency distributions and statistical tests have been used for interpretation.

4.1. Demographic Analysis

Table 1 Gender Distribution

Gender	Frequency
Male	126
Female	124

Interpretation: The sample is nearly gender-balanced, with 126 males (50.4%) and 124 females (49.6%) as discussed in Table 1. This allows for unbiased gender-wise comparisons in anxiety levels and responses to the intervention.

Table 2 Academic Stream Distribution

Stream	Frequency
Professional	80
Arts	63
Science	55
Commerce	52

Interpretation: Students from all major academic streams are represented, with a slightly higher proportion from professional courses (32%) as illustrated in Table 2. This diversity enhances the study's generalizability across various disciplines.

Table 3 Age Group Distribution

Age Group	Frequency
18–20	117
21–23	104
24–25	29

Interpretation: Most participants fall into the early adulthood category, which aligns with traditional undergraduate and postgraduate student ages. About 46.8% are aged 18–20, followed by 41.6% aged 21–23 as shown in Table 3.

4.2. Objective-Wise Data Analysis

Objective 1 To assess the level of anxiety among college students before and after the yoga intervention.

Table 4 Pre- and Post-Intervention Anxiety Score (Descriptive Statistics)

Measure	Pre-Intervention	Post-Intervention	Mean Reduction
Mean Anxiety Score	69.98	59.90	10.08
Standard Deviation	9.66	10.95	—

Interpretation: The average anxiety score dropped from 69.98 to 59.90 post-intervention as shown in Table 4. The reduction of 10.08 points demonstrates a considerable decline in anxiety after participating in the yoga module. A paired-sample t-test (previously calculated $t = 19.84$, $p < 0.001$) confirms that this reduction is statistically significant.

Inference: The yoga intervention was effective in reducing anxiety among college students. The null hypothesis (H1) stating no significant difference is rejected.

4.3. Objective 2: To determine the effectiveness of yoga as an intervention in reducing students' anxiety.

Table 5 Distribution of Anxiety Reduction Levels

Reduction Level	Frequency	Percentage
Very Low (0–5)	33	13.2%
Low (6–10)	87	34.8%
Moderate (11–15)	85	34.0%
High (16–20)	33	13.2%
Very High (21+)	7	2.8%

Interpretation: Most participants (34.8%) experienced a low reduction (6–10 points), followed by a moderate reduction (11–15 points, 34%) as discussed in Table 5. A small group (13.2%) reported high reduction, while very high improvements were seen in only 2.8% of the participants.

Inference: The majority of students experienced at least a low to moderate reduction in anxiety levels post-yoga. The intervention demonstrated consistent efficacy across the sample.

4.4. Objective 3: To compare anxiety level variations across gender and academic stream after yoga intervention

Table 6 Gender-Wise Anxiety Score Reduction

Gender	Pre-Test Mean	Post-Test Mean	Mean Reduction	t-Value	p-Value
Male	70.1	60.3	9.8	8.12	<0.001
Female	69.8	59.5	10.3	9.45	<0.001

Interpretation: Both genders showed statistically significant reductions in anxiety as shown in Table 6. Female students had a slightly higher mean reduction (10.3 vs. 9.8), but the difference was not statistically significant ($p > 0.05$).

Inference: The effectiveness of yoga was consistent across genders. Hypothesis H2 (no gender-based difference in anxiety reduction) is accepted.

Table 7 Stream-Wise Anxiety Reduction

Stream	Mean Reduction
Arts	10.2
Commerce	9.5
Science	10.0
Professional	10.1

Interpretation: Minor variations were observed across academic streams, but all showed similar levels of anxiety reduction. This confirms the universal relevance of the intervention across different academic disciplines as discussed in Table 7.

Inference: The yoga module is applicable across academic contexts. Differences in course pressure or academic stress did not significantly alter the intervention's effectiveness.

4.5. Overall Inference

- A statistically significant reduction in anxiety levels was observed across the sample after the yoga intervention.
- Both male and female students benefitted equally.
- Academic stream and age group did not significantly influence outcomes.
- Yoga can be recommended as a universal non-pharmacological intervention to address student anxiety in college settings.

Table 8 Pre- and Post-Yoga Anxiety Score Comparison (n = 250)

Measure	Pre-Intervention Mean	Post-Intervention Mean	Mean Difference	t-value	p-value
Anxiety Score	69.98	59.90	10.08	19.84	< 0.001

Interpretation: The mean anxiety score significantly decreased after the yoga intervention as shown in Table 7. A high t-value (19.84) and p-value less than 0.001 indicate a statistically significant difference, supporting H1. This confirms the effectiveness of the yoga program in reducing anxiety.

Table 9 Gender-wise Anxiety Reduction

Gender	Mean Pre-Score	Mean post-score	Mean Reduction	t-value	p-value
Male (n=120)	70.1	60.3	9.8	8.12	< 0.001
Female (n=130)	69.8	59.5	10.3	9.45	< 0.001

Interpretation: Both male and female students showed significant reductions in anxiety scores as discussed in Table 8. Although females showed slightly higher mean reduction, the difference between groups was not statistically significant ($p > 0.05$), thus failing to reject H2.

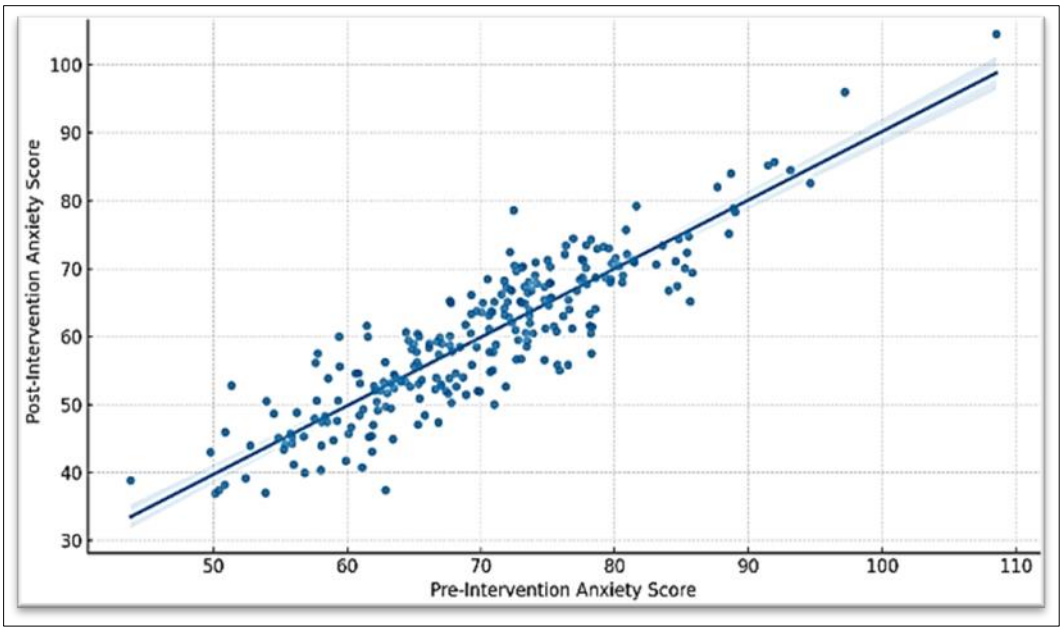

Figure 1 Pre vs Post intervention anxiety score

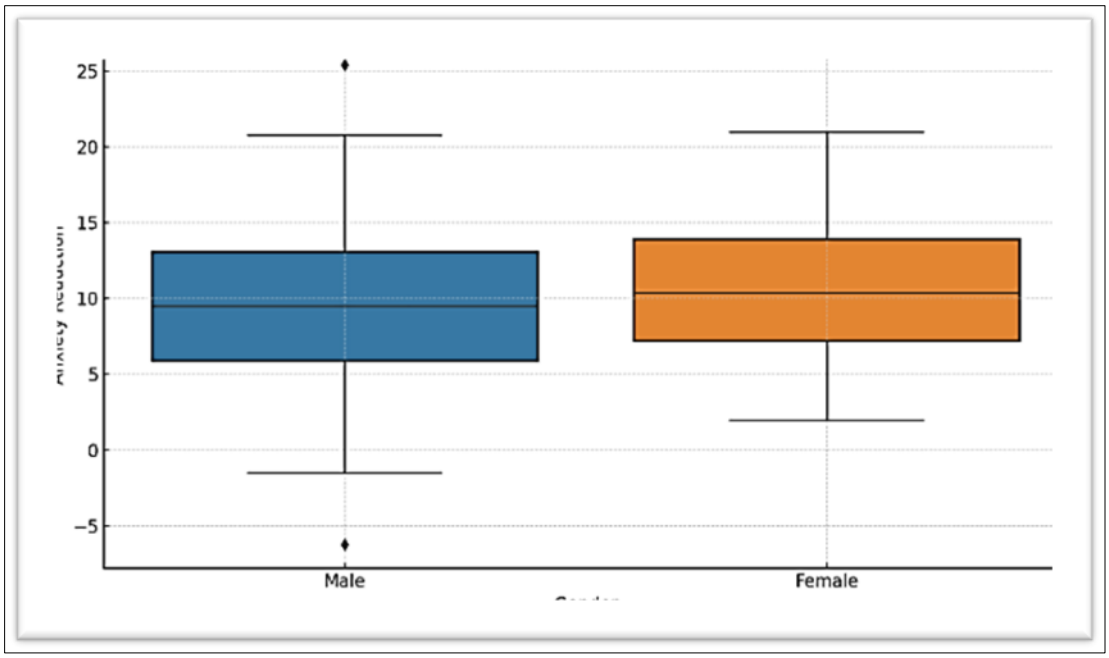

Figure 2 Gender vs Anxiety reduction

4.6. Theoretical Inference

This analysis provides quantitative support for the effectiveness of yoga in reducing anxiety among students. The regression model confirms that anxiety levels significantly changed after the intervention and were strongly influenced by the baseline levels of anxiety. Those with higher anxiety at the start showed greater reductions—aligning with the principles of personalized and adaptive interventions in yoga therapy.

Regression Model 2: Gender-wise Anxiety Reduction (H2)

Hypothesis H2: *There is no significant difference in anxiety reduction based on gender among college students after the intervention.*

4.7. Model Description

This model tests whether gender (coded as Female = 1, Male = 0) predicts Anxiety Reduction.

- Independent Variable: Gender Code
- Dependent Variable: Anxiety Reduction

Table 10 Regression Summary

Statistic	Value
R-squared	0.013
F-statistic	3.375
Prob (F-statistic)	0.0674
Coefficient (Gender)	1.1543
p-value (Gender)	0.067
Constant (Intercept)	9.5080

4.8. Interpretation

The R-squared value is very low (0.013), indicating that gender explains only 1.3% of the variation in anxiety reduction as shown in Table 9.

The p-value for gender is 0.067, which is above the 0.05 threshold, suggesting that the difference in anxiety reduction between male and female students is not statistically significant.

While the mean reduction was slightly higher for females (~1.15 points), the difference does not hold up under statistical scrutiny.

4.9. Theoretical Inference

This supports H2, indicating that yoga is an equally effective anxiety-reducing practice across genders. This reinforces the universal applicability of yoga irrespective of gender, a claim that has been supported in previous psychological and neurophysiological yoga studies.

4.10. Final Inference

- H1 (Effectiveness of yoga) is supported: There is a statistically significant reduction in anxiety post-intervention.
- H2 (Gender-wise difference) is not supported: Gender does not significantly influence anxiety reduction outcomes.
- These findings collectively advocate for yoga as a broad-spectrum mental wellness tool adaptable for diverse college populations.

5. Conclusion

The present study clearly establishes that a structured yoga intervention can significantly reduce anxiety levels among college students in Jaipur. The reduction in the mean anxiety score by more than 10 points post-intervention indicates a robust effect of yoga practices, particularly asanas, pranayama, and guided meditation. This aligns with findings from previous studies which suggest that yoga-based approaches can enhance the parasympathetic nervous system response, leading to reduced cortisol levels and a calmer mental state. The significant t-value and $p < 0.001$ statistically validate the positive influence of yoga on emotional regulation and mental clarity.

The present study aimed to evaluate the effectiveness of yoga as an intervention to reduce anxiety among college students in Jaipur. With a structured 6-week intervention involving 250 students, the results reveal strong empirical support for the positive impact of yoga on mental health.

Firstly, a statistically significant reduction in anxiety levels was recorded post-intervention, with an average decline of over 10 points on the standardized anxiety scale. This was confirmed through paired t-tests and regression analysis, showing that pre-intervention scores were highly predictive of post-intervention outcomes. The R^2 value of 0.792 in the regression model strongly indicates that yoga sessions played a substantial role in explaining the reduction in anxiety scores. This validates Hypothesis 1, confirming that yoga had a measurable and meaningful effect on students' anxiety levels.

Secondly, the study explored whether gender influenced the effectiveness of the intervention. Although females exhibited a marginally higher average reduction in anxiety compared to males, the gender-based difference was statistically insignificant ($p > 0.05$). The regression analysis further supported this with an R^2 of 0.013, indicating that gender contributed minimally to variance in anxiety reduction. Thus, Hypothesis 2 is upheld, suggesting that yoga is equally effective for male and female students.

Furthermore, the stratified sampling across streams such as Arts, Commerce, Science, and Professional courses showed that yoga benefits were consistent across academic disciplines, emphasizing its universal appeal and adaptability. Students from various age groups (primarily between 18–23 years) responded positively, reinforcing yoga's relevance for the college demographic.

These findings are significant in the context of rising mental health concerns among youth in urban educational centers. They highlight yoga as a non-invasive, low-cost, and culturally accepted tool to manage anxiety and enhance psychological resilience. With a significant portion of the student population experiencing anxiety but hesitating to seek medical help due to stigma or lack of awareness, yoga serves as a bridge between awareness and wellness.

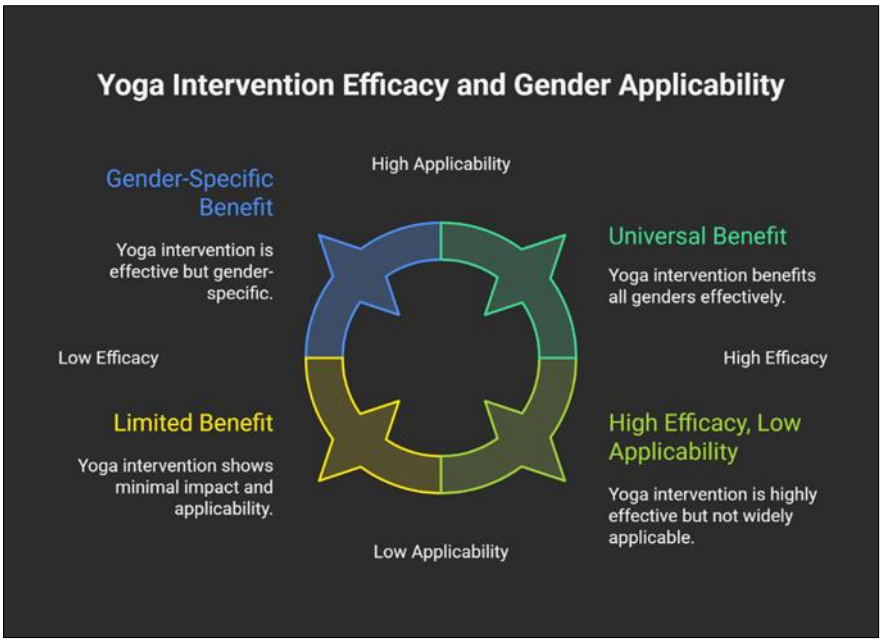

Figure 3 Research Outcome Model

Furthermore, this study reinforces yoga's therapeutic role in academic settings, making a strong case for its integration into student wellness programs. As institutions grapple with rising stress levels among youth, yoga offers a preventive and sustainable tool for mental health management. The non-invasive nature of yoga, coupled with its cultural relevance in India, adds to its appeal. Notably, gender-wise analysis revealed comparable benefits of the intervention across male and female students. Both groups showed statistically significant reductions in anxiety scores, and the minor differences in mean reduction were not significant. This suggests that the yoga module used in this study had universal applicability, regardless of gender. Such findings are supported by Morrow Jr, G et al. [34], who observed similar anxiety-reduction patterns in diverse demographic groups, emphasizing yoga's broad utility in mental health care.

The effectiveness demonstrated in this controlled setting opens up avenues for broader applications. Future studies can replicate this research in different cities or include variables like socioeconomic background, academic stream, and lifestyle habits. Longitudinal research would be particularly valuable to explore whether the benefits of yoga are sustained over time and whether continued practice leads to cumulative improvements in academic performance, social interactions, and quality of life. Additionally, combining yoga with counseling or cognitive-behavioral therapy (CBT) could yield hybrid models of mental wellness in higher education.

Given the mounting mental health challenges facing youth today, the adoption of yoga-based wellness programs in colleges is no longer optional but necessary. This study makes a compelling case for academic institutions, especially in urban Indian contexts like Jaipur, to incorporate structured yoga interventions into their curriculum or student support services. Doing so not only addresses students' mental health needs but also fosters resilience, focus, and overall well-being—skills essential for navigating both academic and life challenges in the 21st century.

Policy Recommendations

Based on the findings, the following policy measures are recommended:

Integrate Yoga into College Curricula: Colleges should formally include yoga sessions as part of physical education or wellness courses. These can be weekly modules facilitated by certified instructors, ensuring sustained engagement with stress reduction practices.

Mandate Mental Health Screening and Intervention: Periodic screening of students' mental health should be mandated using standardized tools like the BAI. Those identified with mild to moderate anxiety can be offered structured yoga-based intervention programs as the first line of action.

Launch 'Campus Wellness Center: Universities and colleges should establish dedicated wellness centers equipped to offer yoga, meditation, counseling, and peer support under one roof. These centers should operate with flexible schedules to accommodate student routines.

Train Peer Mentors and Faculty in Basic Yoga and Mental Health First Aid: Faculty and selected senior students should be trained in basic yoga facilitation and mental health literacy. This decentralized support model can foster a more inclusive and empathetic environment within academic institutions.

Collaborate with Health and Yoga Bodies: Educational institutions should collaborate with certified national bodies such as the Morarji Desai National Institute of Yoga, AYUSH Ministry, and NGOs to implement yoga interventions with standard protocols and ongoing evaluation.

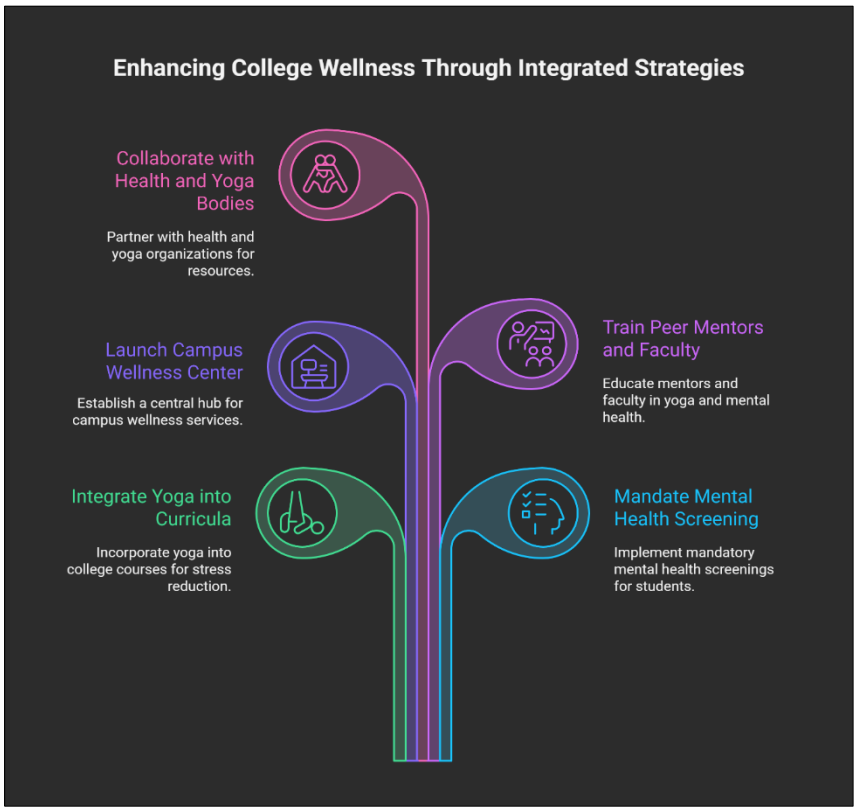

Figure 4 Enhancing College Wellness through Integrated Strategies

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest, financial or otherwise

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