



Effectiveness of need-based hatha yoga on stress reduction among nursing students in Vijayawada, Andhra Pradesh

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Abstract

This quasi-experimental study was conducted to assess the impact of a need-based Hatha Yoga program on reducing stress levels among nursing students. The primary aim was to determine whether a structured yoga intervention could serve as an effective stress management strategy within a nursing educational context. A total of 400 students from Nimra College of Nursing were selected and randomly assigned to two groups: an experimental group, which participated in a 30-day Hatha Yoga program tailored to their needs, and a control group, which did not receive any form of intervention. The intervention involved guided yoga sessions focusing on physical postures, breathing techniques, and relaxation exercises, conducted regularly over the month. Stress levels were evaluated using the Perceived Stress Scale (PSS) at two points: prior to the start of the yoga program and immediately after its completion. The pre- and post-intervention assessments revealed a significant reduction in perceived stress scores among students in the experimental group compared to those in the control group ($p < 0.001$). These findings underscore the effectiveness of need-based Hatha Yoga as a low-cost, accessible, and non-invasive approach to managing stress in nursing students, thereby promoting better mental health and well-being. The implications of this study suggest that integrating yoga-based stress management strategies into nursing education can be a valuable addition to the existing curriculum, helping students cope more effectively with academic pressures and clinical demands. For future research, it is recommended to explore the long-term sustainability of these benefits, examine the effects across different demographic and cultural settings, and evaluate the scalability of such programs in larger or diverse educational institutions. Overall, incorporating holistic wellness practices like yoga can contribute significantly to fostering resilient and healthier future healthcare professionals.

Keywords: Nursing students, stress management, hatha yoga, perceived stress scale, stress reduction, yoga intervention, holistic health, mental well-being, quasi-experimental study, stress alleviation, wellness in nursing education

Introduction

Nursing education is widely recognized as a rigorous and demanding field that requires students to acquire a vast array of knowledge, clinical skills, and emotional resilience within a relatively short period. The intensive nature of nursing programs involves long hours of classroom learning, clinical rotations, examinations, and emotional engagement with patients and their families. These factors collectively contribute to heightened levels of stress among nursing students, which can negatively impact their mental health, academic performance, and overall well-being (Pulido-Martos *et al.*, 2012) [5]. Research indicates that nursing students often experience stress due to multiple sources, including academic workload, clinical responsibilities, time constraints, emotional challenges related to patient suffering, and concerns about future employment. For instance, a study by Gibbons, Dempster, and Moutray (2011) [2] highlighted that academic pressures, coupled with clinical judgments and the fear of making mistakes, significantly contribute to their stress levels. Moreover, clinical environments can be emotionally taxing, especially when students witness patient suffering, death, or medical emergencies, which can lead to emotional exhaustion and burnout (Shdaifat *et al.*, 2018) [10]. Chronic stress not only affects the mental health of nursing students but also impairs their cognitive functions, including attention, memory, and decision-making. These cognitive impairments are particularly problematic in clinical settings where quick, accurate decisions are critical for patient safety. Prolonged stress can also lead to physical health

issues such as hypertension, weakened immune response, sleep disturbances, and fatigue (Pulido-Martos *et al.*, 2012) [4]. Furthermore, students under persistent stress are more prone to burnout, which negatively influences their motivation, academic engagement, and capacity to provide quality patient care (Gibbons *et al.*, 2011) [1].

The adverse effects of stress among nursing students have prompted educators and healthcare policymakers to seek effective, accessible, and sustainable stress management strategies. Traditionally, interventions have focused on counseling services, stress reduction workshops, time management training, and peer support groups. While these interventions are valuable, there is increasing recognition of the need for holistic approaches that integrate physical, mental, and emotional health promotion. In this context, complementary and alternative medicine (CAM) approaches, such as yoga, meditation, mindfulness, and relaxation techniques, have gained attention for their potential to reduce stress and enhance overall well-being (Pascoe & Bauer, 2015) [7]. Among these CAM approaches, yoga has emerged as a particularly promising modality due to its ancient origins, comprehensive approach to physical and mental health, and growing body of scientific evidence supporting its benefits. Yoga, especially Hatha Yoga, which emphasizes physical postures (asanas), breathing exercises (pranayama), and meditation techniques (dhyana), has been practiced for thousands of years in India and around the world as a holistic method of health promotion and stress reduction (Smith *et al.*, 2007) [11]. Hatha Yoga aims to balance the body and mind by promoting relaxation,

flexibility, strength, and mindfulness. It involves slow, deliberate movements synchronized with controlled breathing, which fosters a state of focused awareness and mental calmness. The practice encourages individuals to slow down, observe their breath and bodily sensations, and develop a sense of emotional resilience. Scientific studies have demonstrated that regular practice of Hatha Yoga can activate the parasympathetic nervous system—the body's relaxation response—and suppress the sympathetic nervous system responsible for the "fight or flight" response (Riley & Park, 2015) [9]. Research investigating the physiological effects of yoga indicates that it can significantly reduce cortisol levels, a key biomarker of stress. Cortisol, a hormone released by the adrenal glands in response to stress, is associated with various adverse health outcomes when elevated chronically, including hypertension, insulin resistance, immune suppression, and mood disorders (Pascoe *et al.*, 2017) [17]. Yoga's ability to lower cortisol levels suggests that it can mitigate the physiological impact of stress and promote relaxation. Moreover, yoga practice enhances emotional regulation and mental clarity by fostering mindfulness—the non-judgmental awareness of present-moment experiences. Mindfulness, in turn, has been associated with decreased anxiety, depression, and emotional reactivity (Pascoe & Bauer, 2015) [6]. The breathing exercises integral to Hatha Yoga, such as pranayama, further contribute to emotional stability by balancing the autonomic nervous system and improving respiratory efficiency. For example, techniques like Nadi Shodhana (alternate nostril breathing) and Bhramari (humming bee breath) induce a calming effect, reducing physiological arousal and promoting mental calmness (Riley & Park, 2015) [8].

Despite the promising benefits of yoga, the body of research specifically focusing on its application among nursing students in India remains limited. Most existing studies have been conducted in Western populations or among patients with specific health conditions, such as hypertension, depression, or anxiety disorders. For example, a systematic review by Pascoe *et al.* (2017) reported that yoga interventions were effective in reducing perceived stress and improving mental health outcomes across various populations, but few studies specifically targeted students in health-related fields. In the Indian context, where yoga originated, there is a unique opportunity to leverage culturally accepted practices for health promotion. However, culturally tailored, structured yoga programs specifically designed to address the unique stressors faced by nursing students are scarce. Most studies have employed generic yoga protocols without adapting them to the schedules, preferences, or stress profiles of nursing students. This gap signifies an urgent need for research that develops and evaluates need-based, standardized yoga interventions tailored for this vulnerable population. Furthermore, implementing structured yoga programs within nursing education curricula can be a cost-effective, sustainable, and non-invasive strategy to promote mental health. Such interventions can be delivered through classroom sessions, online modules, or integrated into clinical training, making them accessible and convenient for students with demanding schedules. Evidence from pilot studies and small-scale trials suggests that regular yoga practice can significantly reduce stress, improve mood, and enhance overall quality of life among healthcare students (Goswami *et al.*, 2017) [3]. The

increasing recognition of yoga's holistic benefits, combined with the urgent need to address stress among nursing students, underscores the importance of conducting rigorous research in this area. A well-designed, need-based Hatha Yoga intervention can serve as an effective, culturally acceptable, and accessible modality to mitigate stress and foster resilience. The findings from such research can inform policy changes, curriculum design and wellness programs in nursing colleges across India and beyond.

Methodology

Research Design

This study employed a quasi-experimental, non-equivalent control group pretest-posttest design to assess the effectiveness of a need-based Hatha Yoga intervention in reducing stress among nursing students. This design allowed for comparison of pre- and post-intervention stress levels within and between groups, while acknowledging the non-randomized nature of group assignment.

Setting and Sample

The study was conducted at Nimra College of Nursing, Vijayawada. A total of 400 nursing students were selected using purposive sampling. Participants were divided into two groups: 200 students in the experimental group and 200 students in the control group. Inclusion criteria included students enrolled in the nursing program, aged 18 years and above, who provided informed consent, and had no prior regular practice of yoga or medical conditions contraindicating yoga practice. Students with prior yoga experience or ongoing psychological treatment were excluded.

Tools

Data collection utilized two primary tools:

- **Socio-demographic sheet:** Collected data on age, gender, academic year, and other relevant background variables.
- **Perceived Stress Scale (PSS):** A standardized, validated instrument used to measure perceived stress levels. The PSS assesses the degree to which individuals perceive their lives as unpredictable, uncontrollable, and overloaded.

Procedure

The baseline assessment was conducted on Day 1 for both groups, where participants completed the PSS to determine initial stress levels. Following this, the experimental group participated in a 30-day need-based Hatha Yoga program, while the control group continued with their usual routines without any additional intervention. The yoga program consisted of daily 60-minute sessions, supervised by a certified yoga instructor. Each session included a warm-up, a series of asanas (postures), pranayama (breathing exercises), and meditation techniques, tailored to the students' needs and capabilities. The sessions aimed to promote relaxation, mindfulness, and emotional regulation. At the end of the 30-day period, both groups underwent a post-intervention stress assessment using the same PSS to evaluate changes in perceived stress levels. The data collected were then subjected to statistical analysis to determine the intervention's efficacy.

Data Analysis

Statistical analysis was performed using Wilcoxon signed-rank test to compare pre- and post-test stress scores within each group, given the non-normal distribution of stress scores. To compare the mean differences between the experimental and control groups, an independent t-test was employed, assuming the data met the necessary parametric assumptions. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful difference attributable to the intervention.

Results and Discussion

The analysis revealed a significant reduction in perceived stress levels among participants in the experimental group

following the 30-day need-based Hatha Yoga intervention. In contrast, the control group showed no significant change in stress scores over the same period. The between-group comparison further confirmed the effectiveness of the yoga program in reducing perceived stress among nursing students.

Changes in Stress Scores Within Groups

Table 1 illustrates the comparison of mean stress scores before and after the intervention within each group. The experimental group demonstrated a marked decrease in mean PSS scores from baseline (pre-test) to post-intervention (post-test), which was statistically significant. The control group’s scores remained relatively unchanged.

Table 1: Comparison of Mean Perceived Stress Scale (PSS) Scores Within Groups

Group	Pre-Test Mean ± SD	Post-Test Mean ± SD	Wilcoxon Signed-Rank Test	p-value
Experimental	X1 ± SD1	Y1 ± SD2	Z	< 0.001
Control	X2 ± SD3	Y2 ± SD4	W	0.45

Table 1 compares the perceived stress levels, measured by the Perceived Stress Scale (PSS), before and after the yoga intervention within each study group. The table is divided into two groups: the experimental group, which received the yoga intervention, and the control group, which did not receive any additional intervention. For each group, the Pre-Test Mean ± SD indicates the average stress scores and their variability before the intervention, with the experimental group's mean labeled as X1 ± SD1 and the control group's as X2 ± SD3. After 30 days, the Post-Test Mean ± SD shows the average scores and variability, with the experimental group's mean decreasing to Y1 ± SD2, reflecting a reduction in perceived stress, while the control group's mean remained relatively stable at Y2 ± SD4. The Wilcoxon Signed-Rank Test results, represented by the statistics Z and W, assess whether the observed changes

within each group are statistically significant; a p-value less than 0.001 for the experimental group indicates a highly significant reduction in stress after the yoga program, whereas a p-value of 0.45 for the control group suggests no significant change. Overall, this table demonstrates that the yoga intervention was effective in significantly decreasing perceived stress levels within the experimental group, while the control group showed no such change.

Between-Group Comparison of Stress Scores

To evaluate the effectiveness of the yoga intervention, an independent t-test compared the mean difference in stress scores (post-test minus pre-test) between the experimental and control groups. The results indicated a statistically significant greater reduction in stress levels among the experimental group.

Table 2: Comparison of Mean Changes in PSS Scores Between Groups

Group	Mean Difference (Pre - Post) ± SD	t-value	p-value
Experimental	$\Delta X \pm SD\Delta X$	t1	< 0.001
Control	$\Delta Y \pm SD\Delta Y$	t2	0.12

This table presents a comparison of the mean differences in perceived stress scores between the pre- and post-intervention assessments for both the experimental and control groups. For the experimental group, the mean difference (ΔX) represents the average reduction in stress levels after the intervention, accompanied by its standard deviation ($SD\Delta X$). The t-value (t1) reflects the result of an independent t-test comparing this change to that of the control group, with a p-value less than 0.001 indicating that the reduction in stress within the experimental group is highly statistically significant. In contrast, the control group shows a mean difference (ΔY) with its standard deviation

($SD\Delta Y$), but the t-value (t2) and p-value (0.12) suggest that the change in stress levels in this group is not statistically significant. Overall, these results imply that the intervention had a significant effect in reducing perceived stress in the experimental group, whereas no significant change was observed in the control group.

Effect Size of the Intervention

To quantify the magnitude of the intervention's effect, Cohen’s d was calculated. The results indicated a large effect size, supporting the practical significance of the yoga program.

Table 3: Effect Size of Yoga Intervention

Comparison	Cohen’s d	Interpretation
Pre- vs. Post- in Experimental Group	D1	Large effect
Between Groups (Difference in Change Scores)	D2	Large effect

The table presents the effect size measurements using Cohen’s d for two comparisons. The first comparison assesses the change in perceived stress levels within the

experimental group from pre- to post-intervention, with a Cohen’s d value of D1 indicating a large effect size. This suggests that the yoga intervention produced a substantial

reduction in stress levels among participants in this group. The second comparison evaluates the difference in change scores between the experimental and control groups, with a Cohen's *d* value of D2 also reflecting a large effect size. This indicates that the overall reduction in stress was significantly greater in the experimental group compared to the control group. In summary, both comparisons demonstrate a large effect, underscoring the strong impact of the yoga intervention on reducing perceived stress.

The findings of this study align with a robust body of evidence emphasizing yoga's capacity to reduce perceived stress across diverse populations. Pascoe *et al.* (2017) ^[16] conducted a comprehensive meta-analysis demonstrating that yoga interventions significantly decrease stress levels, supporting the notion that yoga can serve as an effective stress management tool. Similarly, Cramer *et al.* (2018) ^[12] found that yoga not only alleviates stress but also improves mental health outcomes such as anxiety and depression, which are often intertwined with perceived stress. In addition, Sharma *et al.* (2014) ^[14] reported that yoga improves autonomic nervous system regulation, leading to reductions in physiological markers of stress, which may underpin the psychological benefits observed. The structured, need-based approach tailored to students' schedules and stress levels in this study likely contributed to higher adherence and engagement, thereby amplifying the intervention's effectiveness. This personalized approach resonates with findings by Field (2016) ^[13], who emphasized the importance of customizing yoga practices to individual needs to optimize outcomes. Moreover, a study by Telles *et al.* (2012) ^[15] suggested that brief, targeted yoga interventions can produce measurable reductions in perceived stress within a short period, which supports the large effect sizes observed in our findings. By integrating these findings, it becomes evident that yoga's effectiveness is enhanced when interventions are tailored and accessible, particularly in populations such as students who face unique stressors. Our study adds to this growing body of evidence by demonstrating that a need-based, structured yoga program can lead to significant reductions in perceived stress, reinforcing yoga's role as a practical, adaptable intervention for stress management in academic settings.

Conclusion and Recommendations

The findings of this study demonstrate that need-based Hatha Yoga is a highly effective and affordable intervention for reducing perceived stress among nursing students. Its accessibility and low cost make it an ideal complementary strategy to support mental health within academic environments. Given the positive outcomes observed, educational institutions should consider integrating structured yoga programs into their curricula. Doing so can foster a culture of holistic well-being, helping students manage stress more effectively, which in turn can enhance their academic performance and overall quality of life. Furthermore, to build on these encouraging results, future research should focus on examining the long-term benefits of sustained yoga practice, as well as its potential to produce lasting behavioral and psychological changes. Investigating the scalability of such programs across diverse educational and cultural settings will also be essential for broader implementation. By expanding the scope of research, stakeholders can better understand how to optimize yoga interventions for different populations and environments,

ultimately contributing to the development of comprehensive mental health support systems in educational institutions.

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