

ORIGINAL RESEARCH

Effects of Yoga and Om Meditation on Stress and Mindfulness Among University Students: A Randomized Controlled Trial

Efectos del yoga y la meditación sobre el estrés y la atención plena entre estudiantes universitarios: un ensayo controlado aleatorio

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Received: July 28, 2025.

Accepted: April 9, 2026.

Conflicts of interest: None.

DOI: <https://doi.org/10.71164/socialmedicine.v19i3.2026.2303>

Abstract

Background: University students frequently experience significant stress due to various factors, including academic pressure. Mindfulness-based interventions, such as yoga and Om meditation, show promise in reducing stress and improving mental well-being. However, further research is needed to determine their efficacy, particularly among university students. **Aim.** To evaluate the effectiveness of yoga and Om meditation in reducing stress and enhancing mindfulness among university students over a six-week period. **Methodology.** A total of 35 university students were randomly assigned to either the intervention group (yoga and Om meditation) or the waitlist control group. The intervention group participated in a structured six-week program consisting of daily yoga sessions combined with Om meditation. Stress levels were assessed using the Perceived Stress Scale (PSS), and mindfulness was measured using the Freiburg Mindfulness Inventory (FMI). Data analysis included paired sample t-tests to evaluate within-group differences and independent t-tests to compare between-group differences. **Results.** The normality test indicated that FMI data were normally distributed in the yoga group. A paired sample t-test revealed a statistically significant increase in mindfulness scores ($p < .001$). In contrast, the PSS data were not normally distributed in the yoga group. Consequently, the Wilcoxon signed-rank test was used, showing a statistically significant reduction in stress scores ($p < .001$). **Conclusion.** This study suggests that a six-week combined yoga and Om meditation intervention significantly enhances mindfulness and reduces stress among university students, highlighting the potential of these practices to promote student mental health.

Keywords: Om meditation, Mindfulness, Stress reduction, Yoga, University students, Randomized Controlled Trial

Resumen

Antecedentes. Los estudiantes universitarios suelen experimentar un estrés significativo debido a diversos factores, incluida la presión académica. Las intervenciones basadas en la atención plena, como el yoga y la meditación, se muestran prometedoras para reducir el estrés y mejorar el bienestar mental. Sin embargo, se necesita más investigación para determinar su eficacia, especialmente entre los estudiantes universitarios. **Objetivo.** Evaluar la eficacia del yoga y la meditación (om) para reducir el estrés y mejorar la atención plena entre estudiantes universitarios durante un período de seis semanas. **Metodología.** Un total de 35 estudiantes universitarios fueron asignados aleatoriamente al grupo de intervención (yoga y meditación om) o al grupo de control en lista de espera. El grupo de intervención participó en un programa estructurado de seis semanas que consistió en sesiones diarias de yoga combinadas con meditación om. Los niveles de estrés se evaluaron mediante la Escala de Estrés Percibido (EEP) y la atención plena se midió mediante la Encuesta de Atención Plena de Friburgo (EAP). El análisis de datos incluyó pruebas t de muestras pareadas para evaluar las diferencias intragrupo y pruebas t independientes para comparar las diferencias intergrupo. **Resultados.** La prueba de normalidad indicó que los datos de la encuesta presentaron una distribución normal en el grupo de yoga. Una prueba t para muestras pareadas reveló un aumento estadísticamente significativo en las puntuaciones de atención plena ($p < 0.001$). En cambio, los datos de estrés percibido no presentaron una distribución normal en el grupo de yoga. Por consiguiente, se utilizó la prueba de rangos con signo de Wilcoxon, que mostró una reducción estadísticamente significativa en las puntuaciones de estrés ($p < 0.001$). **Conclusión.** Este estudio sugiere que una intervención combinada de yoga y meditación om de seis semanas mejora significativamente la atención plena y reduce el estrés entre los estudiantes universitarios, lo que pone de relieve el potencial de estas prácticas para promover la salud mental de los estudiantes.

Palabras clave: Meditación Om, Atención plena, Reducción del estrés, Yoga, Estudiantes universitarios, Ensayo controlado aleatorizado



Introduction

Stress is a prevalent issue among university students, often resulting from academic pressure, social expectations, and financial concerns. The World Health Organization (WHO) identifies stress as a significant contributor to mental health challenges worldwide.⁽¹⁾ Prolonged stress can lead to anxiety, depression, and other psychological disorders.⁽²⁾⁽³⁾ Studies indicate that stress is highly prevalent among teenagers and young adults, with prevalence rates ranging from 20% to 45%.⁽⁴⁾ A study shows that 46.6% of Indian university students experience moderate to high levels of stress,⁽⁵⁾ highlighting the need for effective stress management strategies.

Chronic stress is closely linked to the endocrine system, influencing hormonal regulation and overall physiological balance.⁽⁷⁾ Stress can trigger excess cortisol production, leading to adverse health effects such as high blood pressure, metabolic disorders, and immune suppression. Additionally, chronic stress has been associated with increased risks of diabetes and cardiovascular diseases.⁽⁸⁾

Mindfulness-based interventions, including yoga and meditation, have been widely recognized for their ability to reduce stress and enhance psychological resilience. Mindfulness involves maintaining awareness of the present moment while observing thoughts and emotions without judgment. Regular practice has been shown to improve emotional regulation, cognitive function, and overall well-being.

Yoga, an ancient practice integrating physical postures, breath control, and meditation, promotes mental and physical health. The *Yoga Sutras* of Patanjali describe the Eight Limbs of Yoga, which encompass ethical guidelines, physical discipline, and meditation techniques aimed at achieving self-awareness and inner balance. Research suggests that regular yoga practice enhances cognitive function, reduces anxiety, and fosters emotional stability.

Om meditation is a specific form of mindfulness practice that involves chanting or silently repeating the sound "Om" as a meditative focus. Rooted in traditional yogic philosophy, the sound Om represents different states of consciousness—waking, dreaming, and deep sleep—symbolizing

the primordial vibration of the universe. Studies suggest that Om chanting significantly reduces anxiety and enhances relaxation by modulating brainwave activity and promoting parasympathetic nervous system activation. Regular yoga and Om meditation practice have been associated with reduced stress levels, improved cognitive function, and enhanced overall well-being. These practices serve as non-pharmacological approaches for managing stress-related conditions and promoting long-term mental health benefits.

Stress and the endocrine system are widely associated and mutually reinforcing. Numerous factors influence the stress response through the endocrine system. Numerous endocrine functions, including those involving the hypothalamus, pituitary, adrenal, and adrenergic systems, gonads, thyroid, and pancreas, can be activated or altered by stress.

According to the World Health Organization (WHO), stress, defined as any type of change causing strain on the body, mind, or emotions, is a condition resulting from the mind-body connection, crucial in the development of various diseases.⁽⁹⁾ Chronic stress can lead to overstimulation of the adrenal glands, triggering excess cortisol production and potentially causing conditions like Cushing's syndrome, characterized by weight gain, high blood pressure, and insulin resistance.⁽⁸⁾ Stress can also disrupt thyroid function, affecting hormone production and conversion, leading to hypothyroidism or hyperthyroidism, impacting metabolism, energy levels, and overall health. Additionally, stress hormones like cortisol can interfere with insulin sensitivity and glucose metabolism, potentially exacerbating diabetes. Stress can also suppress the immune system, making the body more vulnerable to infections and worsening autoimmune conditions, thereby affecting the endocrine system. Personal characteristics alter how stress impacts individuals.⁽¹⁰⁾

Mindfulness

Mindfulness entails paying deliberate attention to your thoughts, emotions and bodily sensations, observing as they come and go without passing judgment.⁽¹¹⁾ Rather than allowing transient thoughts and emotions to dominate an individual, mindfulness serves as an effective mechanism for self-regulation. Cultivating a heightened

consciousness of one's internal experiences, including sustained attention, emotional regulation, and somatic awareness, is the primary objective of mindfulness meditation practices.⁽¹²⁾

Beyond its traditional roots as a holistic practice, yoga is recognized as a multifaceted intervention for enhancing global health and well-being. *Patanjali's Yoga Sutras*, one of the foundational texts on the practice, details the Eight Limbs of Yoga—encompassing ethical guidelines (Yama), observances (Niyama), physical postures (Asana), breath control (Pranayama), sensory withdrawal (Pratyahara), concentration (Dharana), meditation (Dhyana), and integration (Samadhi)—which collectively aim to foster self-realization and mental clarity.⁽¹³⁾ Ultimately, the core objective of contemporary yoga practice is to cultivate and preserve optimal physiological and psychological health.⁽¹⁴⁾

According to data from the National Health Survey, 51% of the surveyed cohort reported participating in yoga courses. Within this population, increased energy (66%), improved immunological function (50%), and overall health promotion or disease prevention (28%) were cited as primary motivators for practice. Furthermore, individuals reported utilizing yoga to manage specific health conditions, including general stress (6%), arthritis (6%), and chronic back pain (20%).⁽¹⁵⁾ By harmonizing somatic and psychological processes, yoga protects against systemic strain and mitigates chronic stress. Consequently, regular adherence to these methods enhances neurocognitive outcomes, including sustained concentration, working memory, cognitive performance, and psychological optimism.⁽¹⁶⁾

For over 5,000 years, meditation has been utilized as a spiritual and therapeutic practice. Accumulating evidence indicates that mindfulness meditation enhances cognitive, psychological, and physiological well-being.⁽⁶⁾ Documented systemic benefits include positive neuroplastic alterations, enhanced immunological and inflammatory regulation, and reduced serum cholesterol levels.⁽¹⁷⁾ Within the yoga tradition, the sacred syllable "OM" combines the distinct phonetic components of A, U (or O), and M to represent different states of consciousness—specifically waking, dreaming, and deep sleep. This combination symbolizes a primordial vibration.⁽¹⁸⁾ Consequently, Om

meditation involves chanting or silently repeating this sound as a cognitive focal point. While deeply rooted in Vedic traditions, it has gained global prominence as a validated mindfulness and relaxation technique.

Structured Om chanting practices hold the potential to substantially mitigate clinical anxiety. When combined with regular yoga, meditation serves as a vital non-pharmacological therapeutic approach for managing chronic stress and emotional dysregulation. Furthermore, these lifestyle interventions can improve glycemic control and blood pressure regulation in metabolic disorders like diabetes mellitus.⁽¹⁹⁾ By optimizing these pathways, meditation concurrently addresses systemic hypertension and insulin resistance, thereby lowering the long-term risks of associated vascular diseases.

Material and methods

Participants

Participants for this study were recruited from the Banara Hindu University, located in Varanasi, India. Recruitment efforts included announcements and fliers posted on campus bulletin boards, posts on social media platforms, and emails sent via university mailing lists. All participants provided written informed consent before being included in the study.

A total of 35 healthy university students, aged between 17 and 27 years, were enrolled. Eligibility criteria included the absence of any diagnosed physical illnesses, neurological disorders such as stroke or transient ischemic attacks, and any mental health conditions that could interfere with participation in yoga or meditation practices. Furthermore, participants in the control group were required to have no prior experience or exposure to meditation. (Figure:1)

Participants were randomly assigned to either the intervention group or the waitlist control group using a computer-generated randomization sequence to ensure unbiased group allocation. The intervention group received a structured yoga and Om meditation program, while the control group did not receive any intervention during the study period but were placed on a waitlist to receive it afterward.

Intervention

The intervention group participated in a structured program that lasted for six weeks, with sessions conducted for one hour per day, five days a week. Each session began with an opening prayer to create a focused and calm environment, followed by warm-up exercises designed to prepare the body for physical activity. Participants then engaged in the practice of Surya Namaskar (sun salutations), which served as the primary asana sequence to promote physical flexibility, strength, and balance.

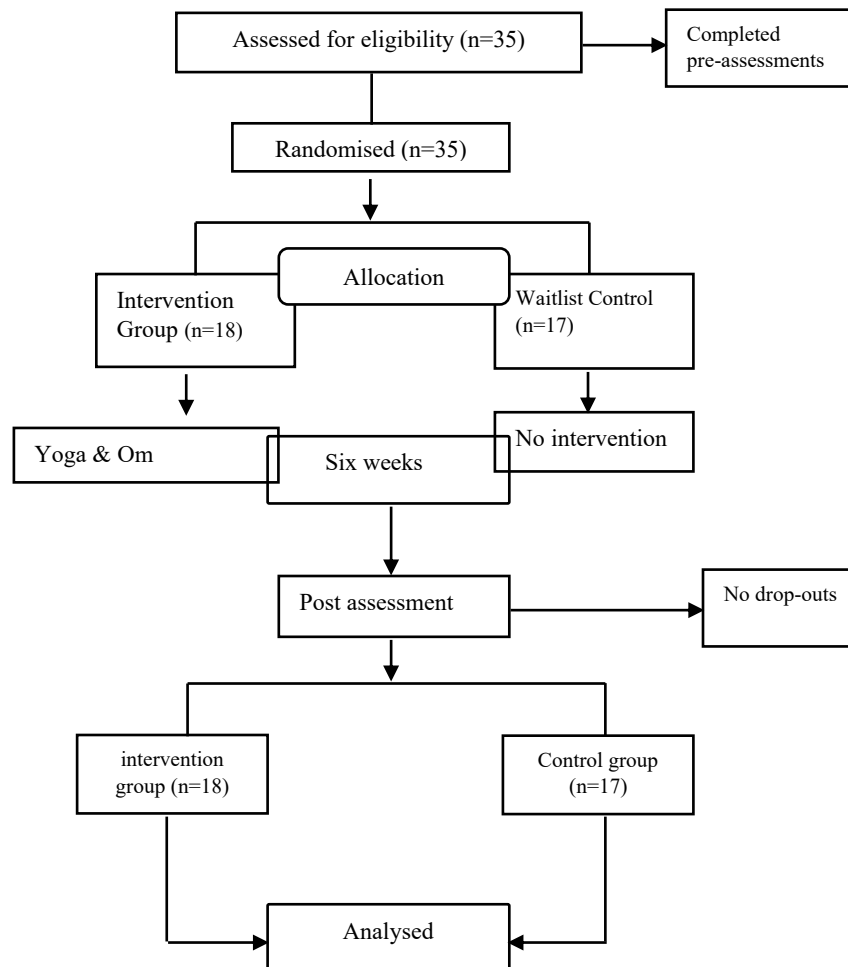
Following the physical practice, a 10-minute session of Om-based mindfulness meditation was conducted. During this period, participants either

chanted or silently focused on the sound "Om" as a meditative anchor, promoting mental clarity and relaxation. The meditation sessions included guided instructions and interactive elements to ensure correct practice and sustained engagement throughout the program.

Outcome

Stress was measured by Perceived stress scale PSS, where lower scores indicate low stress and high scores indicate high stress ⁽²⁰⁾. Mindfulness was measured by Freiburg Mindfulness Inventory (FMI), where lower score indicates less mindfulness and a high score indicates more mindfulness.⁽²¹⁾

Figure:1 Participant Enrolment and Inclusion Flow Diagram



Result

Table:1 Intervention and waitlist control group

Variables	Yoga		Control		P
	Pre	Post	Pre	Post	
FMI	26.4 (± 3.75)	41.0 (± 4.43)	26.3 (± 2.4)	26.4 (± 2.31)	< .001
PSS	25.0 (± 3.61)	16.1 (± 3.32)	21.2 (± 4.69)	21.2 (± 4.69)	< .001

The present study evaluated the effects of yoga and Om meditation on stress and mindfulness among university students using the Freiburg Mindfulness Inventory (FMI) and the Perceived Stress Scale (PSS). Data analysis was conducted using **Jamovi software**.

Within-Group Differences

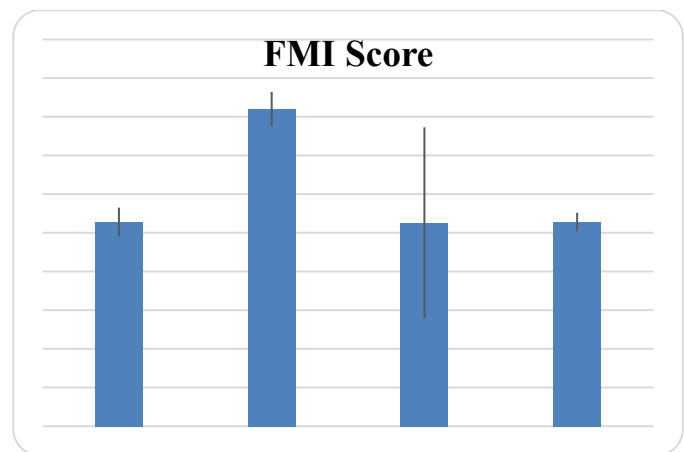
Yoga Group: The normality test indicated that FMI data were normally distributed in the yoga group. A paired sample t-test was performed, revealing a statistically significant increase in mindfulness scores ($p < .001$). Whereas, the PSS data were not normally distributed in the yoga group. Consequently, the Wilcoxon signed-rank test was used, and a statistically significant reduction in stress scores was found ($p < .001$). (Table 1)

Between group Comparisons: The pretest PSS total score average was 25.0 (± 3.61) in the yoga group and 21.2 (± 4.69) in the control group. The post-test PSS total score average was 16.1 (± 3.32) in the yoga group and 21.2 (± 4.69) in the control group, with a statistically significant difference ($p < .001$). The pretest FMI total score average was 26.4 (± 3.75) in the yoga group and 26.3 (± 2.4) in the control group. The post-test FMI total score average was 41.0 (± 4.43) in the yoga group and 26.4 (± 2.31) in the control group, with a statistically significant difference ($p < .001$). (Table 1)

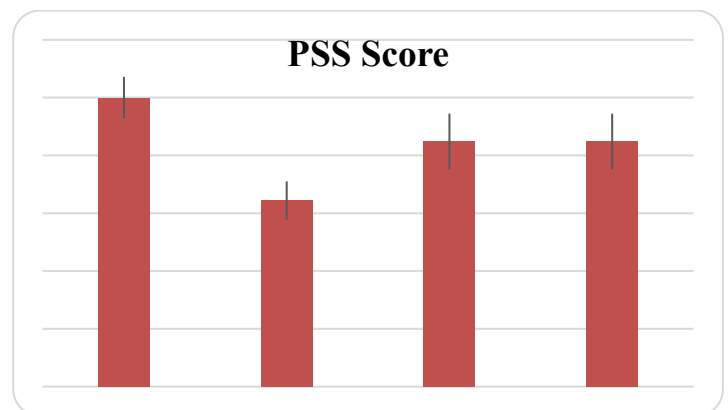
These results suggest that the practice of yoga and Om meditation significantly enhances mindfulness and reduces stress among university students, (graph 3 & graph 4) as evidenced by the marked improvements in both FMI and PSS scores in the yoga group compared to the control group.

Control Group: The normality test showed that FMI data were not normally distributed. Therefore, the Wilcoxon signed-rank test was performed, which did not show any statistically significant difference. The PSS data were normally distributed in the control group. A paired sample t-test was conducted, showing no statistically significant difference in stress scores.

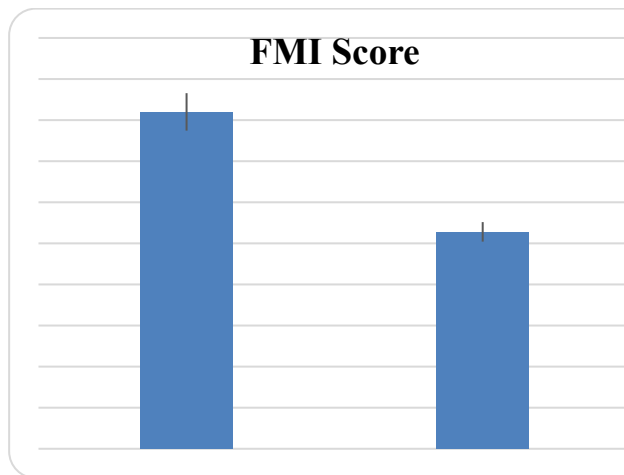
Graph:1 FMI Pre & Post of both groups.



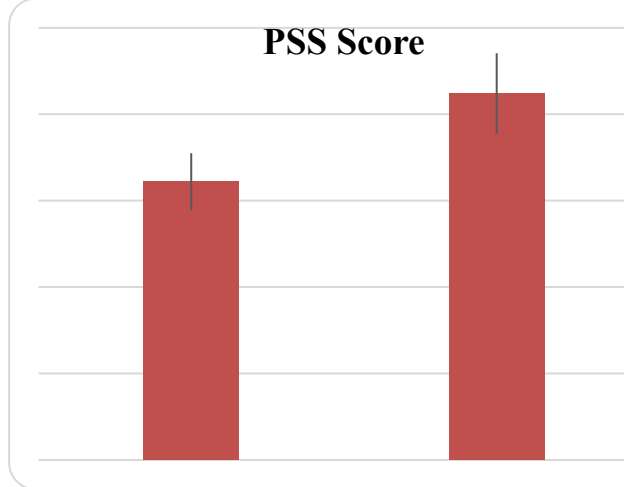
Graph:2 PSS Pre & Post of both groups.



Graph:3 Mindfulness Yoga & Control Post.



Graph:4 PSS experimental and Control group.



Discussion

This study found that a 6-week Yoga and Om Meditation program significantly improved university students' mindfulness and stress levels, compared to the control group. The intervention group showed lower stress levels than the control group, indicating the program's efficacy in managing stress and mental well-being.⁽²²⁾ Yoga has been shown to alleviate stress and improve mental well-being among university faculty, staff, and graduate students. Studies have also shown similar benefits in healthy adults, with yoga nidra reducing life stress intensity and improving sleep quality.⁽²³⁾

Yoga involves physical postures, respiratory exercises, and relaxation methods, which reduce sympathetic activation and enhance parasympathetic activity. This leads to decreased heart rate and blood pressure, improved vagal tone, and reduced stress perception.⁽²⁴⁾ Yoga also releases endorphins, which bind to opioid receptors in the central nervous system, resulting in pleasure and reduced stress perception.⁽²⁵⁾ Meditation, on the other hand, alleviates stress through complex neurophysiological systems, affecting the amygdala, prefrontal cortex,⁽²⁶⁾ and nucleus accumbens, enhancing emotional regulation and stress management.⁽²⁷⁾ Meditation music also decreases cortisol levels and regulates the HPA axis, promoting a more equilibrated physiological condition.⁽²⁸⁾ The integration of yoga and Om Meditation in an intervention can lead to decreased perceived stress and enhanced mindfulness.⁽²⁹⁾ These therapies have been shown to be effective in improving mental well-being among university students.⁽³⁰⁾

Conclusion

The study indicates that a 6-week intervention combining Yoga and Om Meditation techniques significantly enhances mindfulness and reduces stress among university students. These findings highlight the potential of such interventions in promoting mental health and well-being in university students.

Acknowledgment

We appreciate the support of all participants and faculties of the department, whose knowledge and understanding sustained us for this work. Their support and cooperation played a significant role in overcoming various challenges during the research.

Statement of Ethics

Study approval statement

This study protocol was reviewed and approved by the Institutional Ethics Committee, Banaras Hindu University, approval number is CTRI/2023/08/056821.

Consent to participate statement

Written informed consent was obtained from all participants prior to their participation in this study. All participants signed consent forms indicating their voluntary agreement to participate in the research.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Statement

This study was not supported by any sponsor or funder.

Conflicts of interest: NA,

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ISSN: 1557-7112