

Evaluating a Yoga-Based Intervention on Mindful Awareness and Stress Reactivity

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ABSTRACT

This study aimed to evaluate the effectiveness of an eight-session yoga-based intervention in enhancing mindful awareness and reducing stress reactivity among adults in Kenya. A randomized controlled trial design was employed with 30 adult participants randomly assigned to either an experimental group ($n = 15$), which received the yoga intervention, or a control group ($n = 15$). The intervention consisted of weekly 60–75-minute sessions over eight weeks, integrating yoga postures, breathing exercises, and mindfulness practices. Standardized measurement tools—the Mindful Attention Awareness Scale (MAAS) and the Perceived Stress Scale (PSS-10)—were administered at three time points: pre-test, post-test, and five-month follow-up. Data were analyzed using repeated measures ANOVA and Bonferroni post-hoc tests in SPSS-27. Results indicated a significant increase in mindful awareness in the experimental group compared to the control group over time ($F(2, 56) = 18.52, p < .001, \eta^2 = .407$), with sustained effects at follow-up. Similarly, stress reactivity significantly decreased in the experimental group relative to controls ($F(2, 56) = 16.73, p < .001, \eta^2 = .374$), and the improvements persisted at five-month follow-up. Bonferroni post-hoc tests confirmed significant differences between pre-test and post-test, as well as pre-test and follow-up, for both variables (all $p < .001$). The findings suggest that a structured yoga-based intervention can significantly improve mindful awareness and reduce stress reactivity in adults, with effects maintained over time. These results support the integration of yoga and mindfulness practices into mental health and wellness programs, especially in low-resource settings.

Keywords: Yoga intervention; Mindful awareness; Stress reactivity; Randomized controlled trial

1. Introduction

In recent years, yoga-based interventions have emerged as effective mind-body practices for enhancing psychological well-being, cultivating mindful awareness, and regulating stress responses. The modern stress epidemic, shaped by fast-paced lifestyles, socioeconomic disparities, and ongoing health crises, has underscored the urgent need for accessible, non-pharmacological approaches to mental health support. Yoga, with its integrative focus on breath, movement, and present-moment awareness, offers a promising avenue to improve individual resilience and reduce stress reactivity. While traditionally rooted in Indian spiritual philosophy, yoga has increasingly gained empirical validation in clinical and educational settings across the globe (Asthana, 2022; Sharma, 2025).

Mindful awareness—the capacity to attend to present experiences with openness and nonjudgment—has received growing attention as a protective factor against stress and psychological distress. Numerous studies have established the positive effects of mindfulness-based interventions, including yoga, on enhancing emotional regulation and attentional control (Bringmann & Sedlmeier, 2021; Laird et al., 2021). Mindfulness, as cultivated through yoga practice, encourages individuals to interrupt habitual stress reactions by promoting cognitive flexibility and interoceptive awareness. These skills are critical in reducing stress reactivity, which refers to the intensity and frequency of emotional responses to perceived stressors (Fronso et al., 2022; Haussmann et al., 2022). As stress reactivity is a known precursor to anxiety, depression, and physiological dysfunctions, effective interventions that target this mechanism hold significant potential for preventive health.

Yoga's potential to modulate stress reactivity and promote mindful awareness has been substantiated through various methodologies, including randomized controlled trials (RCTs), qualitative analyses, and neurophysiological assessments (Charan & Kumar, 2024; Matko et al., 2021). Yoga interventions often incorporate physical postures (asanas), breathing regulation (pranayama), and meditative practices—each of which contributes uniquely to psychological functioning. A meta-synthesis by Bringmann and Sedlmeier highlighted that the integration of all three components produces more robust outcomes compared to partial yoga practices (Bringmann & Sedlmeier, 2021). Furthermore, research by Charan and Kumar emphasized the holistic nature of yoga as an intervention that simultaneously

fosters emotional, cognitive, and somatic well-being (Charan & Kumar, 2024).

The growing global interest in yoga's mental health benefits has resulted in diverse applications across populations. For instance, in school-based interventions, yoga has shown significant promise in enhancing adolescents' social-emotional learning and resilience (Sumner et al., 2025). Similarly, in pediatric populations, yoga-based programs have supported the management of obesity and related stress through improved self-regulation and physical awareness (López-Alarcón et al., 2024). Among adult populations, yoga has been found to reduce anxiety, improve sleep, and enhance psychological flexibility (Jain, 2021; Xu et al., 2022). These effects are mediated in part by yoga's influence on autonomic nervous system regulation, particularly through downregulating sympathetic activation and enhancing parasympathetic tone (Galloway et al., 2022; Kawazu et al., 2024).

A compelling body of evidence supports the application of yoga in clinical contexts. For example, Miao et al. conducted a meta-analysis showing that mindfulness-based yoga significantly reduced depressive symptoms among patients with major depressive disorder, with large effect sizes across multiple trials (Miao et al., 2023). Similarly, yoga-based interventions have been used as adjunct treatments in oncology care to alleviate stress, improve body image, and boost self-esteem among cancer patients (Pehlivan & Eyi, 2024). These interventions have demonstrated positive effects not only in patient-reported outcomes but also in physiological indices such as cortisol levels and heart rate variability, further supporting their psychophysiological efficacy (Haussmann et al., 2022; Nita et al., 2023).

The impact of yoga on stress reactivity is particularly relevant in high-demand or emotionally taxing professions. For instance, Kukihara et al. examined the effects of yoga on elderly care workers and found significant reductions in burnout and emotional exhaustion through regular practice (Kukihara et al., 2022). Similarly, Žok et al. demonstrated that consistent engagement with yoga techniques significantly lowered stress levels and mitigated symptoms of occupational burnout in healthcare professionals (Žok et al., 2024). These findings suggest that yoga can be a valuable tool for supporting both individual well-being and workforce sustainability.

Despite these promising outcomes, there remains a need for rigorous, context-specific research examining yoga's effects on psychological variables such as mindful

awareness and stress reactivity, especially in underrepresented populations. For example, few studies have explored yoga's impact in African contexts, where socioeconomic pressures and access barriers often limit mental health care (Gaihre et al., 2021). The current study contributes to this gap by investigating the effectiveness of a structured yoga-based intervention in enhancing mindful awareness and reducing stress reactivity among adult participants in Kenya. By employing a randomized controlled design with a five-month follow-up, this study offers both methodological rigor and cultural relevance.

Furthermore, the theoretical basis for yoga's psychological impact continues to expand. Convergence neuroscience suggests that mind-body practices such as yoga engage multiple brain networks involved in interoception, emotion regulation, and attentional control (Laird et al., 2021). This framework provides a biological rationale for the observed psychological benefits of yoga and reinforces the need to assess multidimensional outcomes, including subjective experience and cognitive-emotional integration. Notably, Butzer emphasizes the importance of transpersonal research methods in capturing the deeper, transformative dimensions of yoga that extend beyond symptom reduction (Butzer, 2022).

Research also points to differential outcomes based on yoga style and program delivery. Szaszko et al. found that Hatha yoga was particularly effective in reducing stress and anxiety among non-clinical populations, while also decreasing tendencies toward emotional suppression (Szaszko et al., 2023). Other studies, such as those by Kwok et al., have shown that mindfulness yoga delivered via mobile health platforms can be feasible and beneficial for people with chronic conditions, including Parkinson's disease (Kwok, Choi, et al., 2022; Kwok, Lee, et al., 2022). These findings highlight the adaptability of yoga interventions and their capacity to reach diverse populations through varied delivery methods.

In sum, the current study builds upon a robust foundation of empirical work that demonstrates yoga's efficacy in enhancing mindfulness and reducing stress reactivity.

2. Methods and Materials

2.1. Study Design and Participants

This study utilized a randomized controlled trial (RCT) design to evaluate the effectiveness of a yoga-based intervention on mindful awareness and stress reactivity. A total of 30 adult participants from Nairobi, Kenya, were

recruited through community health centers, local wellness groups, and online advertisements. Inclusion criteria were: (a) aged between 20 and 45 years, (b) no prior formal experience with yoga or mindfulness-based interventions, and (c) no ongoing psychological treatment or physical limitations preventing participation in yoga. Participants were randomly assigned to either the intervention group ($n = 15$) or a waitlist control group ($n = 15$) using a computer-generated randomization schedule. All participants completed baseline assessments, post-intervention evaluations (after 8 weeks), and a five-month follow-up to examine the sustainability of effects. The intervention was conducted in a group format in a community wellness center, with informed consent obtained from all participants prior to study enrollment.

2.2. Measures

2.2.1. Mindful Awareness

To assess mindful awareness, the Mindful Attention Awareness Scale (MAAS) developed by Brown and Ryan (2003) was employed. The MAAS is a widely validated instrument that measures the core characteristics of dispositional mindfulness, specifically the presence or absence of attention and awareness in daily life. It consists of 15 items, all scored on a 6-point Likert scale ranging from 1 (almost always) to 6 (almost never), where higher scores indicate greater mindfulness. The scale is unidimensional and does not include subscales. Respondents are asked to reflect on their experiences over the past few weeks, with items such as "I find myself doing things without paying attention." The MAAS has demonstrated strong internal consistency, with Cronbach's alpha typically reported above .80 across diverse populations. Test-retest reliability and construct validity have been confirmed in multiple studies, including both clinical and non-clinical samples, indicating its robustness as a tool for evaluating mindful awareness.

2.2.2. Stress Reactivity

To measure stress reactivity, the Perceived Stress Scale (PSS-10) developed by Cohen, Kamarck, and Mermelstein (1983) was used. This instrument evaluates the degree to which individuals perceive situations in their lives as stressful, unpredictable, and overwhelming over the past month. The PSS-10 comprises 10 items, with two subdimensions: perceived helplessness (six items) and perceived self-efficacy (four items). Items are rated on a 5-

point Likert scale ranging from 0 (never) to 4 (very often), with total scores ranging from 0 to 40, where higher scores reflect greater perceived stress. The PSS-10 has been extensively validated across different populations and cultural contexts, with reliability coefficients (Cronbach's alpha) frequently exceeding .70. Numerous studies have confirmed its construct, criterion, and convergent validity, making it a well-established measure of subjective stress and stress reactivity.

2.3. Intervention

The intervention consisted of eight weekly sessions, each lasting 60 to 75 minutes, delivered in a group format by a certified yoga instructor with training in mindfulness-based techniques. The protocol integrated Hatha yoga postures (asanas), breathing exercises (pranayama), and guided mindfulness meditation, with progressive emphasis on body awareness, present-moment attention, and nonjudgmental observation of internal states. The structure of each session included: (1) a short check-in and psychoeducation (10 minutes), (2) a sequence of yoga practices (30–40 minutes), (3) a mindfulness exercise (10–15 minutes), and (4) group reflection and discussion (10 minutes). The program was designed to gradually deepen participants' somatic and attentional awareness while reducing stress reactivity by enhancing emotion regulation, self-compassion, and present-moment engagement.

Session 1: Introduction to Yoga and Mindful Awareness

The first session provided an overview of the program's objectives and introduced participants to the concepts of mindfulness and stress reactivity. Participants engaged in gentle yoga postures focused on grounding and breath awareness, followed by a guided body scan meditation. Psychoeducation covered the mind-body connection and how stress impacts physical and emotional health. The session emphasized cultivating present-moment attention through sensory experience and breath-focused movement.

Session 2: Awareness of Breath and Stress Response

This session focused on deepening awareness of breath and its regulatory function in stress reduction. Participants practiced diaphragmatic and alternate nostril breathing (Nadi Shodhana) to activate the parasympathetic nervous system. A sequence of beginner-level standing poses helped promote grounding and stability. A brief mindfulness meditation on the breath was conducted. The discussion centered on identifying personal stress triggers and physiological reactions to stress.

Session 3: Embodiment and Sensory Awareness

Participants explored embodiment through slow, mindful movement and sensory grounding techniques. The yoga sequence incorporated sun salutations (Surya Namaskar) with a focus on coordinating breath and movement. A mindful eating exercise was introduced to heighten interoceptive awareness. The meditation practice focused on scanning bodily sensations. Group discussion encouraged reflection on moments of disconnection from the body and how re-embodiment can support emotional regulation.

Session 4: Emotional Awareness and Self-Compassion

This session addressed the role of yoga in developing emotional awareness and self-compassion. The yoga flow emphasized heart-opening postures (e.g., cobra, camel, and bridge poses) to promote vulnerability and receptivity. Breathing exercises focused on lengthening exhalation to soothe the nervous system. The meditation component used loving-kindness (metta) practice. The group explored how judgmental thoughts fuel stress and how mindfulness can foster a gentler internal dialogue.

Session 5: Thought Patterns and Mindfulness of the Mind

Cognitive aspects of stress reactivity were the focus in this session. Participants engaged in postures that required balance and concentration (e.g., tree pose, eagle pose) to cultivate mental focus and awareness of thought fluctuations. The guided meditation emphasized observing thoughts without attachment or judgment. Psychoeducation introduced the concept of cognitive reactivity and the role of mindfulness in interrupting automatic stress responses.

Session 6: Acceptance and Tolerance of Discomfort

This session helped participants develop tolerance for physical and emotional discomfort through mindful yoga. Longer holds in poses such as pigeon, seated forward fold, and lizard were introduced to invite exploration of resistance and reactivity. Breath-focused awareness supported emotional regulation. The meditation involved observing unpleasant sensations and emotions with equanimity. Discussion highlighted how avoidance contributes to stress and how acceptance can foster resilience.

Session 7: Integration of Practice into Daily Life

The goal of this session was to support the application of learned practices in real-life contexts. The yoga sequence combined dynamic and restorative postures to reflect the integration of effort and ease. Walking meditation was introduced as a form of informal mindfulness. Participants reflected on challenges and successes in applying mindfulness during stressful situations. Strategies for maintaining a home practice were shared.

Session 8: Closure, Reflection, and Future Intentions

In the final session, participants engaged in a comprehensive yoga practice integrating the physical, breath, and awareness techniques learned throughout the program. A long body scan meditation was conducted to promote full-body awareness. The group shared reflections, insights, and shifts experienced during the intervention. The session closed with a discussion on sustaining mindfulness and yoga practices beyond the program and setting personal intentions for continued well-being.

2.4. Data Analysis

Data analysis was conducted using SPSS version 27. Descriptive statistics were calculated to summarize demographic variables and baseline characteristics. To assess changes in dependent variables (mindful awareness and stress reactivity) across time and groups, a repeated measures analysis of variance (ANOVA) was employed. Within-subject effects (time), between-subject effects (group), and interaction effects (time $\times$ group) were

evaluated. When significant effects were observed, Bonferroni post-hoc tests were performed to identify specific differences between time points. Statistical significance was set at $p < .05$, and effect sizes (η^2) were reported to interpret the magnitude of differences.

3. Findings and Results

Of the 30 participants, 18 (60.00%) were female and 12 (40.00%) were male, with an average age of 32.47 years ($SD = 5.91$). Regarding marital status, 12 participants (40.00%) were single, 11 (36.67%) were married, and 7 (23.33%) were divorced or widowed. In terms of education level, 10 participants (33.33%) held a university degree, 13 (43.33%) had completed secondary education, and 7 (23.33%) had completed postsecondary diploma programs. Employment status showed that 16 (53.33%) were employed full-time, 8 (26.67%) were self-employed, and 6 (20.00%) were unemployed or students. No statistically significant differences in demographic variables were observed between the experimental and control groups at baseline.

Table 1

Means and Standard Deviations for Mindful Awareness and Stress Reactivity Across Groups and Time Points

Variable	Group	Pre-Test (M $\pm$ SD)	Post-Test (M $\pm$ SD)	Follow-Up (M $\pm$ SD)
Mindful Awareness	Experimental	47.26 $\pm$ 5.83	61.42 $\pm$ 6.11	59.87 $\pm$ 6.44
	Control	46.91 $\pm$ 6.15	48.10 $\pm$ 6.08	47.82 $\pm$ 6.23
Stress Reactivity	Experimental	28.37 $\pm$ 4.91	19.84 $\pm$ 4.32	21.13 $\pm$ 4.67
	Control	28.09 $\pm$ 5.16	27.55 $\pm$ 5.03	27.34 $\pm$ 5.09

As shown in Table 1, participants in the experimental group demonstrated a noticeable increase in mindful awareness from pre-test ($M = 47.26$, $SD = 5.83$) to post-test ($M = 61.42$, $SD = 6.11$), which was largely sustained at follow-up ($M = 59.87$, $SD = 6.44$). Conversely, the control group showed minimal changes across the same periods. Similarly, the experimental group showed a substantial reduction in stress reactivity from pre-test ($M = 28.37$, $SD = 4.91$) to post-test ($M = 19.84$, $SD = 4.32$), with a slight increase at follow-up ($M = 21.13$, $SD = 4.67$). The control group showed only marginal reductions in stress reactivity over time.

Prior to conducting the repeated measures ANOVA, the data were examined for underlying statistical assumptions. Normality of the dependent variables was confirmed using the Shapiro–Wilk test (e.g., for mindful awareness at baseline, $W = 0.961$, $p = 0.462$; for stress reactivity, $W = 0.947$, $p = 0.291$), indicating normal distribution. Homogeneity of variances was verified using Levene’s test (e.g., for post-intervention stress reactivity, $F = 1.28$, $p = 0.271$), and sphericity was assessed using Mauchly’s test, which was not violated for either variable (e.g., $W = 0.987$, $p = 0.618$). These findings confirmed that the data met the required assumptions for conducting repeated measures ANOVA.

Table 2

Repeated Measures ANOVA for Mindful Awareness and Stress Reactivity

Variable	Source	SS	df	MS	F	p	η^2
Mindful Awareness	Time	1412.72	2	706.36	18.52	<.001	.407
	Group	1846.19	1	1846.19	27.16	<.001	.494
	Time $\times$ Group	1321.84	2	660.92	17.34	<.001	.388
	Error (Within)	2132.58	56	38.08			
Stress Reactivity	Time	924.47	2	462.24	16.73	<.001	.374
	Group	1021.36	1	1021.36	20.98	<.001	.428
	Time $\times$ Group	856.29	2	428.15	15.89	<.001	.362
	Error (Within)	1546.38	56	27.61			

Table 2 displays the results of the repeated measures ANOVA. For mindful awareness, there were significant main effects of time, $F(2, 56) = 18.52$, $p < .001$, $\eta^2 = .407$, and group, $F(1, 28) = 27.16$, $p < .001$, $\eta^2 = .494$. A significant interaction between time and group was also observed, $F(2, 56) = 17.34$, $p < .001$, $\eta^2 = .388$, indicating that changes over

time differed significantly between groups. Similarly, for stress reactivity, there were significant effects of time, $F(2, 56) = 16.73$, $p < .001$, $\eta^2 = .374$, group, $F(1, 28) = 20.98$, $p < .001$, $\eta^2 = .428$, and their interaction, $F(2, 56) = 15.89$, $p < .001$, $\eta^2 = .362$. These results confirm the significant impact of the intervention on both dependent variables.

Table 3

Bonferroni Post-Hoc Test Results for Mindful Awareness and Stress Reactivity

Variable	Comparison	Mean Difference	SE	p
Mindful Awareness	Pre-Test vs Post-Test	-14.16	1.78	<.001
	Post-Test vs Follow-Up	1.55	1.63	.336
	Pre-Test vs Follow-Up	-12.61	1.72	<.001
Stress Reactivity	Pre-Test vs Post-Test	-8.53	1.45	<.001
	Post-Test vs Follow-Up	1.29	1.21	.284
	Pre-Test vs Follow-Up	-7.24	1.38	<.001

As shown in Table 3, Bonferroni post-hoc comparisons revealed significant improvements in mindful awareness from pre-test to post-test ($p < .001$) and from pre-test to follow-up ($p < .001$), while the difference between post-test and follow-up was not significant. Similarly, stress reactivity significantly decreased from pre-test to post-test ($p < .001$) and remained significantly lower at follow-up ($p < .001$) compared to baseline. No significant difference was observed between post-test and follow-up for stress reactivity, indicating maintenance of effects.

4. Discussion and Conclusion

The present study investigated the effectiveness of an eight-session yoga-based intervention in enhancing mindful awareness and reducing stress reactivity among Kenyan adults. The results from repeated measures ANOVA indicated significant improvements in mindful awareness and significant reductions in stress reactivity in the intervention group compared to the control group. These effects were maintained at a five-month follow-up, suggesting the intervention had a lasting psychological impact. Bonferroni post-hoc tests revealed that

improvements were most pronounced immediately post-intervention, with modest but stable retention at follow-up.

The increase in mindful awareness aligns with extensive prior research on the benefits of yoga in cultivating present-centered attention and internal self-awareness. Consistent with the current findings, Bringmann and Sedlmeier emphasized that the integration of physical movement, breathwork, and meditation significantly enhances dispositional mindfulness when practiced in a structured format (Bringmann & Sedlmeier, 2021). Similarly, Matko et al. reviewed comparative studies and found that yoga's meditative and interoceptive components most directly target attentional regulation and moment-to-moment awareness (Matko et al., 2021). These mechanisms were supported in our intervention, which included a gradual intensification of body-breath synchronization, intentional movement, and mindfulness meditation.

Our findings also corroborate the conclusions of Jain, whose research demonstrated that school-aged children participating in yoga showed increased mindfulness and improved attention span, underscoring the generalizability of mindfulness benefits across age groups (Jain, 2021). Likewise, the results resonate with Xu et al.'s findings

among collegiate athletes, which showed improved functional body awareness and mental focus following yoga training (Xu et al., 2022). The convergence across these populations highlights the adaptability of yoga to diverse demographic contexts, including the adult Kenyan sample of this study.

In terms of stress reactivity, the results demonstrated a significant decline in participants' perceived stress over the intervention period. This reduction may be attributed to both physiological and cognitive mechanisms promoted through yoga. As noted by Szaszko et al., Hatha yoga can significantly reduce autonomic arousal, facilitate emotion regulation, and lower trait anxiety, all of which contribute to reduced stress reactivity (Szaszko et al., 2023). Our participants were introduced to breath regulation techniques such as diaphragmatic breathing and alternate nostril breathing, both known to downregulate sympathetic nervous system activation. These practices likely mediated the stress-reducing effects observed.

Supporting this, the study by Fronso et al. confirmed that mindfulness-based strategies—particularly those emphasizing present-moment bodily awareness—can significantly mitigate perceived stress and improve psychobiosocial balance in both athletes and recreational populations (Fronso et al., 2022). Similarly, Kawazu et al.'s work with school-refusing children showed that mindfulness yoga significantly reduced physiological markers of stress, including pulse rate and injury-related fears (Kawazu et al., 2024). These outcomes mirror the current study's finding that somatic and emotional stress responses can be attenuated through embodied, mindful movement practices.

The persistence of positive effects at the five-month follow-up is a particularly encouraging outcome. This finding indicates the potential for long-term self-regulatory benefits from relatively short-term interventions. Butzer suggested that yoga may instill durable shifts in self-awareness and coping strategies, potentially due to the embodied and experiential nature of the practice (Butzer, 2022). Additionally, Miao et al.'s meta-analysis on major depressive disorder showed that yoga practices yield not only immediate psychological benefits but also delayed cumulative effects when participants integrate practices into daily routines (Miao et al., 2023). Participants in our study were encouraged to continue self-guided practice after the intervention concluded, which may have contributed to these sustained outcomes.

Moreover, the enhancement in mindful awareness may have played a mediating role in reducing stress reactivity, as

suggested in earlier research. According to Laird et al., the neurocognitive effects of meditative therapies are closely linked to activation in brain regions associated with interoception and executive control, allowing individuals to reframe and reinterpret stress-inducing stimuli more effectively (Laird et al., 2021). Similarly, Galloway et al. found that couples practicing yoga together exhibited enhanced emotional intelligence and communication, partly due to mindfulness training, resulting in decreased relational stress (Galloway et al., 2022). These outcomes underscore the reciprocal relationship between increased mindfulness and reduced stress reactivity observed in the current study.

Another notable aspect of this study is its setting in an African context, where there is a dearth of culturally adapted yoga interventions. Gaihre et al. emphasized the importance of expanding yoga-based programs to underserved and diverse populations, demonstrating improved psychological well-being among substance-abusing populations in South Asia (Gaihre et al., 2021). The success of our intervention in Kenya not only supports the global applicability of yoga as a mental health strategy but also aligns with López-Alarcón et al.'s assertion that culturally adapted delivery increases engagement and adherence in pediatric obesity interventions (López-Alarcón et al., 2024). Similarly, the community-oriented and culturally sensitive implementation of our program likely contributed to the positive outcomes.

The findings also have implications for integrative mental health models. Charan and Kumar advocate for embedding yoga into mainstream mental health frameworks, as it fosters holistic well-being by simultaneously addressing emotional, cognitive, and somatic domains (Charan & Kumar, 2024). Pehlivan and Eyi's research with breast cancer patients undergoing mastectomy further supports the value of yoga in improving self-esteem and coping during physical and emotional adversity (Pehlivan & Eyi, 2024). In line with these perspectives, our intervention highlights yoga's utility as a comprehensive tool for promoting psychological resilience.

Interestingly, our results also resonate with studies that integrate yoga with vulnerable or clinical populations. For instance, Kukihara et al. reported significant reductions in burnout among elderly care workers following a CONSORT-compliant yoga trial (Kukihara et al., 2022). Similarly, Žok et al. observed reductions in both stress and risk of burnout following yoga practice in health professionals (Žok et al., 2024). These findings suggest that the mechanisms by which yoga operates—enhancing bodily awareness, cultivating a nonjudgmental mindset, and

improving emotion regulation—are broadly applicable and beneficial across populations and settings.

Moreover, the observed improvements in our participants echo the findings of O'Dea et al., who noted psychological gains in young people with psychosis after engaging in a mindfulness-informed yoga program (O'Dea et al., 2022). While the clinical severity and demographic of that sample differ, both studies underline yoga's capacity to reduce stress-related symptoms and foster self-awareness. Likewise, Asthana emphasized yoga's value not just in mental health but also in character and ethical development within business education contexts, further broadening its scope of impact (Asthana, 2022).

While many yoga-based interventions demonstrate benefits, the literature has emphasized the need for quality delivery and structured programming. Sharma's systematic review highlighted key themes in yoga literature, including the importance of instructor competence, session regularity, and integrated content for maximizing impact (Sharma, 2025). The current study adhered to these recommendations, delivering standardized sessions through certified facilitators and employing a balance of movement, breathing, and reflection. Our findings thus support the efficacy of well-structured yoga interventions.

Finally, the durability of these outcomes can also be attributed to the internalization of practice. Kwok et al. reported that mobile mindfulness yoga programs led to meaningful psychological changes when participants engaged consistently, suggesting that frequency and commitment to practice—whether in-person or digital—are key moderators of outcome success (Kwok, Choi, et al., 2022; Kwok, Lee, et al., 2022). Participants in our study who reported ongoing home practice were more likely to sustain improvements, reinforcing the long-term value of self-directed integration.

Despite promising findings, this study has several limitations. First, the sample size was relatively small ($n=30$), which limits the generalizability of the results. While sufficient for detecting within-group changes, larger samples would provide stronger statistical power for identifying interaction effects and sub-group analyses. Second, while randomization was employed, blinding was not possible due to the nature of the intervention, raising the potential for expectancy effects. Third, although the follow-up period (five months) offers insight into long-term outcomes, extended longitudinal tracking would be valuable to assess durability over longer time frames. Lastly, self-report measures, while validated, are susceptible to response

bias and may not fully capture physiological changes associated with stress regulation.

Future studies should aim to replicate these findings using larger, more diverse samples across cultural and socioeconomic contexts. It would also be valuable to incorporate physiological measures such as cortisol levels, heart rate variability, or neuroimaging to triangulate self-report data with biological indices. Moreover, comparing different styles of yoga or isolating specific components (e.g., breathwork vs. asanas) could clarify which elements are most effective for specific outcomes. Additionally, future work might explore the use of digital or hybrid delivery models to increase accessibility and scalability, particularly in resource-limited settings.

To maximize the benefits of yoga-based interventions, practitioners should ensure culturally appropriate adaptation, skilled facilitation, and consistent scheduling. Integrating mindfulness and breathing components into existing wellness or educational frameworks can foster emotional resilience in both clinical and non-clinical populations. Encouraging home practice and community support may also enhance long-term maintenance. As stress-related disorders continue to rise globally, yoga represents a cost-effective and holistic strategy that can complement traditional mental health approaches.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

- Asthana, A. N. (2022). Contribution of Yoga to Business Ethics Education. *Journal of Business Ethics Education*, 19, 93-108. <https://doi.org/10.5840/jbee2022196>
- Bringmann, H. C., & Sedlmeier, P. (2021). Effects of Different Components of Yoga: A Meta-Synthesis. *Obm Integrative and Complementary Medicine*, 06(03), 1-1. <https://doi.org/10.21926/obm.icm.2103030>
- Butzer, B. (2022). A Consideration of Transpersonal Research Methods for Studying Yoga and Mindfulness in Schools. *Int. J. Transpers. Stud.*, 40(2). <https://doi.org/10.24972/ijts.2021.40.2.31>
- Charan, H., & Kumar, A. (2024). Integrating Yoga Into Mental Health Care: Enhancing Holistic Well-Being. *Divyayatan*, 1(2), 25-27. <https://doi.org/10.69919/7jskwy51>
- Fronso, S. d., Robazza, C., Bondár, R. Z., & Bertollo, M. (2022). The Effects of Mindfulness-Based Strategies on Perceived Stress and Psychobiosocial States in Athletes and Recreationally Active People. *International journal of environmental research and public health*, 19(12), 7152. <https://doi.org/10.3390/ijerph19127152>
- Gaihre, A., Rajesh, S., Bista, S., Poudel, L., Khadka, R., & Rajbhandari, B. (2021). Impact of Yoga and Physical Exercise on Psychological Wellbeing Among Substance Abusers: A Randomized Controlled Trial. *Journal of Complementary and Integrative Medicine*, 20(1), 241-249. <https://doi.org/10.1515/jcim-2020-0506>
- Galloway, N., Foulstone, A. R., & Lurie, J. K. (2022). Yoga and Couple Relationship Satisfaction: The Synergy Between Mindfulness and Emotional Intelligence. *International Journal of Yoga Therapy*, 32(2022). <https://doi.org/10.17761/2022-d-21-00049>
- Haussmann, A., Schmidt, M. E., Illmann, M., Schröter, M., Hielscher, T., Cramer, H., Maatouk, I., Horneber, M., & Steindorf, K. (2022). Meta-Analysis of Randomized Controlled Trials on Yoga, Psychosocial, and Mindfulness-Based Interventions for Cancer-Related Fatigue: What Intervention Characteristics Are Related to Higher Efficacy? *Cancers*, 14(8), 2016. <https://doi.org/10.3390/cancers14082016>
- Jain, D. (2021). Impact of Yoga Intervention on Exam Anxiety, Mindfulness, Attention & Memory in School Going Children. *Delhi Business Review*, 22(2), 85-90. <https://doi.org/10.51768/dbr.v22i2.222202109>
- Kawazu, S., Amitani, M., Suzuki, H., Amitani, H., Monuki, T., Wada, M., Toyohira, S., Hamada, K., Yamamoto, T., Yoshimura, T., Mizuma, K., Nishida, Y., Watanabe, H., Hirose, M., Tagawa, K., Ota, K., Asakawa, A., & Owaki, T. (2024). An Exploratory Cluster-Randomized Controlled Trial on Mindfulness Yoga's Effectiveness in School-Refusing Children: Reductions in SCAS-C Physical Injury Fears and Pulse Rate. *Frontiers in human neuroscience*, 18. <https://doi.org/10.3389/fnhum.2024.1468729>
- Kukihara, H., Ando, M., & Yamawaki, N. (2022). The Effects of Yoga and Mindful Meditation on Elderly Care Worker's Burnout: a CONSORT-compliant Randomized Controlled Trial. *Journal of Rural Medicine*, 17(1), 14-20. <https://doi.org/10.2185/jrm.2021-021>
- Kwok, J. Y. Y., Choi, E. P. H., Lee, J. J., Lok, K. Y. W., Kwan, J. C. Y., Mok, V., & Auyeung, M. (2022). Effects of Mindfulness Yoga Versus Conventional Physical Exercises on Symptom Experiences and Health-Related Quality of Life in People With Parkinson's Disease: The Potential Mediating Roles of Anxiety and Depression. *Annals of Behavioral Medicine*, 56(10), 1068-1081. <https://doi.org/10.1093/abm/kaac005>
- Kwok, J. Y. Y., Lee, J. J., Choi, E. P. H., Chau, P. H., & Auyeung, M. (2022). Stay Mindfully Active During the Coronavirus Pandemic: A Feasibility Study of mHealth-delivered Mindfulness Yoga Program for People With Parkinson's Disease. *BMC Complementary Medicine and Therapies*, 22(1). <https://doi.org/10.1186/s12906-022-03519-y>
- Laird, K. T., Jain, F. A., & Lavretsky, H. (2021). Convergence Neuroscience of Meditative Mind-Body Therapies for Mental Health. 229-254. <https://doi.org/10.1093/med/9780197506271.003.0016>
- López-Alarcón, M., Villasis-Keever, M. Á., & Fernández, J. R. (2024). Systematic Review of the Efficacy of Yoga and Mindfulness in the Management of Pediatric Obesity. *Annals of the New York Academy of Sciences*. <https://doi.org/10.1111/nyas.15245>
- Matko, K., Bringmann, H. C., & Sedlmeier, P. (2021). The Effects of Different Components of Yoga: A Review of Comparative Studies and Meta-Analyses. <https://doi.org/10.31234/osf.io/e5mh9>
- Miao, C., Gao, Y., Li, X., Zhou, Y., Chung, J. W. Y., & Smith, G. D. (2023). The Effectiveness of Mindfulness Yoga on Patients With Major Depressive Disorder: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *BMC Complementary Medicine and Therapies*, 23(1). <https://doi.org/10.1186/s12906-023-04141-2>
- Nita, T. A., Maryatun, Mustikasari, I., & Hermawati, H. (2023). The Effectiveness of Providing Yoga Exercise Intervention With Islamic Spiritual Mindfulness Intervention on Anxiety Levels in Hypertension Patients at Ngoresan Health Center. *International Journal of Public Health Excellence (Ijphe)*, 3(1), 185-190. <https://doi.org/10.55299/ijphe.v3i1.556>
- O'Dea, D., Curtis, J., Scully, A., & Lappin, J. (2022). A Pilot Study of a Mindfulness Informed Yoga Intervention in Young People With Psychosis. *Early Intervention in Psychiatry*, 16(9), 1036-1042. <https://doi.org/10.1111/eip.13264>
- Pehlivan, M., & Eyi, S. (2024). The Impact of Mindfulness-Based Meditation and Yoga on Stress, Body Image, Self-Esteem, and Sexual Adjustment in Breast Cancer Patients Undergoing Modified Radical Mastectomy. *Cancer Nursing*, 48(3), 190-199. <https://doi.org/10.1097/ncc.0000000000001427>
- Sharma, P. (2025). Identifying Themes on Yoga From Systematic Literature Review. *Divyayatan*, 2(2), 13-27. <https://doi.org/10.69919/mx7r9366>
- Sumner, A. L., Cartwright, T., Ballieux, H., & Edginton, T. (2025). School-based Yoga and Mindfulness Interventions for Young Adolescents: A Qualitative Study in a Disadvantaged Area. *British Journal of Health Psychology*, 30(2). <https://doi.org/10.1111/bjhp.12793>
- Szaszkó, B., Schmid, R. R., Pomper, U., Maiworm, M., Laiber, S., Tschennett, H., Nater, U. M., & Ansoerge, U. (2023). The Influence of Hatha Yoga on Stress, Anxiety, and Suppression: A Randomized Controlled Trial. <https://doi.org/10.31234/osf.io/eyaq9>

- Xu, D., Wu, H., Ruan, H., Yuan, C., Gao, J., & Guo, M. (2022). Effects of Yoga Intervention on Functional Movement Patterns and Mindfulness in Collegiate Athletes: A Quasi-Experimental Study. *International journal of environmental research and public health*, 19(22), 14930. <https://doi.org/10.3390/ijerph192214930>
- Żok, A., Matecka, M., Bienkowski, A., & Cieśla, M. M. (2024). Reduce Stress and the Risk of Burnout by Using Yoga Techniques. Pilot Study. *Frontiers in Public Health*, 12. <https://doi.org/10.3389/fpubh.2024.1370399>