

## REVIEW ARTICLE

# Efficacy of Yoga Interventions in Alleviating Physician Burnout: A Review of Randomized Controlled Trials

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### ABSTRACT

**Background:** Physician burnout has become a significant concern in the medical community. It is characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment. Considering physicians' unique challenges, there is an increasing interest in exploring holistic interventions such as yoga, which may benefit stress management and overall well-being.

**Methods:** We conducted a comprehensive analysis of randomised controlled trials published between 2014 and 2023, assessing the impact of yoga interventions on physician burnout across various databases.

**Results:** Our analysis uncovered five randomized trials demonstrating that yoga can effectively alleviate symptoms of physician burnout, such as depersonalization and emotional exhaustion. Furthermore, yoga has been shown to improve professional fulfillment, flexibility, and overall well-being. These advantages extend beyond stress relief and encompass various aspects of professional life.

**Conclusion:** Yoga interventions can alleviate physician burnout by targeting physical, emotional, and mental health factors. According to the findings, incorporating yoga-based wellness programs in health-care settings can promote physician well-being, enhance job satisfaction, and improve patient care. Additional research is required to strengthen the evidence base and facilitate the implementation of customized yoga interventions in the medical profession.

## 1. INTRODUCTION

Burnout is a well-established occupational syndrome with significant implications for various professions, particularly in the medical field.<sup>[1]</sup> It is a complex phenomenon characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment due to chronic occupational stress.<sup>[2]</sup> While burnout is not officially classified as a medical condition, it has been linked to mental illness and can have severe consequences for individuals and organizations. It is a multidimensional occupational phenomenon that can affect individuals in various contexts, as demonstrated by studies on parental burnout and burnout among university students during the COVID-19 pandemic.<sup>[3-5]</sup>

Research has attempted to distinguish between burnout as a psychological construct and a clinical entity, emphasizing the

complexity of its definitions.<sup>[6]</sup> The Maslach Burnout Inventory (MiBI) is a tool that helps assess burnout. Created in 1981 by Christina Maslach and Susan E. Jackson, it evaluates burnout through three main aspects – emotional exhaustion, depersonalization, and reduced personal accomplishment. The MBI comes in two variants – The MBI-Human Services Survey and the MBI-General Survey. As a self-administered questionnaire, it quantifies burnout levels across dimensions. Despite criticism for not encompassing the full spectrum of burnout, its ease of use, demonstrated reliability and validity make it an essential instrument for understanding and addressing burnout.<sup>[7]</sup> Establishing a harmonized definition of burnout is essential for effective interventions and prevention strategies.<sup>[8]</sup>

Physician burnout is a prevalent issue that affects a significant portion of medical professionals, estimated to be around 54.4% in 2014 up from 45.5% in 2011.<sup>[9]</sup> It is characterized by emotional exhaustion, depersonalization, and a diminished sense of accomplishment.<sup>[10]</sup> The causes of burnout are multifactorial, including poor work-life balance,

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long hours, and high-stress environments.<sup>[11]</sup> Personality traits such as neuroticism, agreeableness, and conscientiousness can also impact the likelihood of experiencing burnout.<sup>[12]</sup> Burnout among physicians has been linked to negative consequences such as increased medical errors, reduced patient satisfaction, longer recovery times, and decreased work effort.<sup>[13]</sup> The consequences of physician burnout extend beyond the individual practitioner to impact the healthcare system and patient outcomes.<sup>[14]</sup> Studies have shown that burnout can lead to decreased empathy, work dissatisfaction, reduced productivity, and an increased risk of medical errors.<sup>[13]</sup> Furthermore, burnout can result in increased depersonalization of patients, lower personal accomplishment, higher employee turnover rates, and worse patient outcomes.<sup>[15]</sup> Physicians experiencing burnout are at a higher risk of adverse consequences for themselves, their patients, and their families.<sup>[16]</sup> Addressing burnout requires a clear understanding of its definition and contributing factors, with organizational aspects playing a crucial role in its development.<sup>[17]</sup>

Several strategies have been proposed to address physician burnout, including patient advocacy, investing in leadership skills, reducing administrative burdens, utilizing advanced practice providers, implementing mindfulness and professional development programs, creating support groups, enhancing emotional intelligence, encouraging health behaviors, and empowering residents and fellows.<sup>[18-22]</sup> A comprehensive approach, including these strategies, can help combat burnout and improve physicians' overall well-being.

*Yoga* is an ancient tradition rooted in Indian culture and has been practiced for over five thousand years. It is a comprehensive system encompassing physical postures, breath control, meditative practices, and ethical principles designed to bring harmony to the body, mind, and spirit. "yoga" comes from the Sanskrit word "Yuj," which means the union or integration of individual consciousness with universal consciousness, emphasizing its profound spiritual essence.<sup>[22]</sup> This discipline has been highly regarded for its physical and mental benefits, including promoting mental clarity, emotional resilience, and spiritual connectedness. The multifaceted nature of yoga, which combines ethical guidelines with physical and meditative practices, offers a holistic approach to wellness, influencing neuro-psycho-physiological mechanisms and promoting overall health.<sup>[23-26]</sup>

Physiologically, research has indicated that yoga may lead to a decrease in sympathetic nervous system tone and an increase in parasympathetic vagal activity. This can result in a reduction in stress-related responses.<sup>[27]</sup> Yoga has also been found to decrease cortisol levels and increase GABAergic activity, which can improve mood and reduce anxiety.<sup>[28]</sup> Moreover, yoga practice has been linked to reduced stress hormones, regulation of the HPA axis, triggering of the relaxation response, and enhancement of parasympathetic function, all of which contribute to stress reduction and better response to stressors.<sup>[29]</sup> Psychologically, yoga has been shown to improve mood, relieve stress, and have a calming effect on stress responses in the body, potentially reducing levels of anxiety and depression.<sup>[30]</sup> Furthermore, research has indicated that yoga may aid in stress management, better emotional well-being, and a reduction in inflammation, all of which contribute to stress reduction.<sup>[31]</sup>

Conventional stress management techniques may not effectively address the various aspects of burnout experienced by health-care professionals. Conversely, yoga provides a holistic remedy that nurtures the body, calms the mind, and rejuvenates the spirit. This inclusive option accommodates diverse physical abilities and fits into differing schedules, making it a promising intervention for mitigating burnout symptoms among physicians.<sup>[32-34]</sup> Given the growing

emphasis on holistic health within the medical community, exploring the potential of yoga as a targeted intervention for physician burnout is critical. Against this backdrop, our study aims to examine the efficacy of yoga in mitigating burnout symptoms among physicians. The study will hopefully provide a foundation for evidence-based wellness strategies within healthcare settings and support the development of effective and sustainable solutions for physician burnout.

## 2. OBJECTIVE

Our study aims to assess the efficacy of yoga as a solitary intervention for alleviating burnout among physicians. Unlike broader reviews that investigate various forms of treatment, we intend to examine how yoga's holistic practices can combat burnout by engaging multiple facets of the stress response. This study aspires to bridge the existing research gap and offer a refined perspective on yoga as a feasible, standalone strategy for mitigating burnout among physicians.

## 3. METHODOLOGY

Our research methodology involved an extensive literature review across various databases, including PubMed, Scopus, Cochrane, Google Scholar, and Ovid, to identify studies addressing the impact of yoga on physician burnout. We exclusively focused on randomized controlled trials published in English between 2014 and 2023 incorporating yoga interventions. We excluded conference proceedings and abstract-only studies. Our selection process included screening titles, abstracts, and full texts for relevance, followed by detailed data extraction on study characteristics, such as sample size, design, interventions, controls, and outcomes.

## 4. RESULTS

Our initial search of various databases, including PubMed, Cochrane Library, Google Scholar, and Ovid, yielded 143 publications related to the impact of yoga on physician burnout. After filtering out irrelevant conference abstracts, duplicates, and non-conforming studies, we narrowed down our search to 28 publications for further evaluation. We conducted a thorough screening process based on our defined inclusion criteria, which involved evaluating titles and abstracts and examining full texts. From this process, we found only five studies that met the necessary standards for inclusion in our review. We focused our analysis on identifying randomized trials that explored the impact of yoga on physician burnout, and we identified three such trials. Additionally, we came across two trials that included physicians as part of a broader group of healthcare professionals. In this section, we provide a detailed examination of these selected studies which are also summarised in Table 1.

A randomized controlled pilot trial conducted by Taylor *et al.* compared the effectiveness of trauma-informed yoga with group-format fitness activities as part of an existing wellness program for junior doctors.<sup>[35]</sup> The study measured burnout, traumatic stress, and suicidality at baseline and after 8 weeks. One of the key findings of this trial was a significant reduction in depersonalization scores among participants who had undergone the yoga intervention, as measured by the Maslach Burnout Inventory. In addition, the yoga group showed increased compassion satisfaction, indicating a renewed sense of purpose and satisfaction in their professional roles. The study also found that the yoga group reported notable improvements in flexibility. The study also revealed exciting adherence rates. The personalized yoga sessions had a remarkable 100% attendance rate,

while group fitness sessions had only 45% attendance. This indicates that individualized interventions may be more effective in health-care settings, where schedules are often erratic and demanding. Despite these encouraging outcomes, the study acknowledges its limitations, including the small sample size and the resource-intensive nature of providing personalized yoga sessions.

In their randomized clinical trial Loewenthal *et al.* assessed the feasibility and effectiveness of a yoga-based mind-body intervention (MiBI) called resilience, integration, self-awareness, engagement (RISE) among resident physicians across various specialties and academic medical centers.<sup>[36]</sup> The study included residents from multiple specialty departments at three academic medical centers and was designed as a waitlist-controlled randomized clinical trial. The RISE intervention consisted of 6 weekly sessions and suggested practices for participants to perform at home. The program's feasibility was evaluated across six domains: demand, implementation, practicality, acceptability, adaptation, and integration. In addition, self-reported measures of psychological health, including mindfulness, stress, burnout, and physician well-being, were collected at baseline, immediately post-program, and at a 2-month follow-up. Forty-four participants completed the study and were included in the analysis. On average, participants attended only two out of the six sessions. The feasibility of attending the in-person sessions was rated relatively low, with an average score of 28.9 (SD = 25.6) on a 100-point visual analog scale. However, participants indicated that the feasibility would significantly improve (average score of 69.2, SD = 26.0) if the program were offered virtually. The results demonstrated that participants who received the RISE intervention reported significant improvements in mindfulness, stress levels, burnout, and overall physician well-being from the baseline to the post-program assessment. These positive changes were maintained at the 2-month follow-up, suggesting the sustained impact of the intervention.

The clinical trial conducted by Korkmaz *et al.* aimed to investigate the effectiveness of Sudarshan Kriya Yoga (SKY), a comprehensive yoga breathing and meditation-based program, in reducing stress and enhancing well-being among practicing physicians.<sup>[37]</sup> The trial included 129 participants from different geographical locations, and it compared the effects of SKY with a control group that received stress management education (SME). The participants in the SKY group reported significant reductions in stress, anxiety, and depression, as measured by the 42-item Depression, Anxiety, and Stress Scale. These improvements were maintained post-training and at the end of the intervention period. Furthermore, the SKY group experienced a notable decrease in insomnia, as evidenced by the Regensburg Insomnia Scale (RIS) scores.

Besides psychological benefits, the SKY practitioners also reported increased professional fulfillment and significant reductions in work exhaustion, interpersonal disengagement, and overall burnout, as measured by the professional fulfillment index. These outcomes suggest that SKY alleviates stress, improves sleep quality, and positively impacts professional life aspects closely linked to burnout. Interestingly, the study did not find a significant impact of SKY on self-reported professional errors, indicating that the benefits of SKY may be more pronounced in the domains of psychological well-being and professional satisfaction rather than directly influencing clinical performance.

The study conducted by Lin *et al.* aimed to evaluate the impact of a 12-week yoga program on mental health professionals.<sup>[38]</sup> The study focused on work-related stress, stress adaptation, and autonomic nerve activity, measured through heart rate variability (HRV). The high levels of work-related stress experienced by mental health

professionals can lead to burnout and negatively affect both their well-being and their professional performance. The participants were divided into two groups: an experimental group participating in the yoga program and a control group not engaging in yoga exercises. Work-related stress and adaptation assessments were conducted before and after the program. At the same time, HRV was measured at baseline, at the 6-week midpoint, and after completing the 12-week yoga program. The findings revealed that the yoga group experienced a significant reduction in work-related stress ( $t = -6.225, P < 0.001$ ) and significant enhancements in stress adaptation ( $t = 2.128, P = 0.042$ ). The control group did not show significant changes in these measures. When comparing the two groups' mean differences in pre- and post-intervention scores, the yoga group exhibited a significant decrease in work-related stress ( $t = -3.216, P = 0.002$ ). However, changes in stress adaptation were not statistically significant ( $P = 0.084$ ). Furthermore, the yoga group showed a significant increase in autonomic nerve activity at both the 6-week midpoint ( $t = -2.799, P = 0.007$ ) and the post-intervention assessment ( $t = -2.099, P = 0.040$ ), indicating an improvement in autonomic balance. This change was not observed in the control group. The study concluded that participating in a 12-week yoga program can significantly reduce work-related stress and improve autonomic nerve activity among mental health professionals. Based on these findings, the researchers suggest that clinicians, administrators, and educators consider offering yoga classes to help health professionals manage their work-related stress and enhance their autonomic nervous system balance, contributing to better overall health and professional efficiency.

Bhardwaj *et al.* conducted a study to determine if a 12-week yoga-based intervention aided by mobile health (mHealth) technology could reduce burnout and improve the professional quality of life (PQoL) of healthcare providers (HCPs) at a tertiary care hospital in North India.<sup>[39]</sup> The study enrolled 98 HCPs, with an average age of  $28.26 \pm 3.547$  years. Participants were randomly assigned to either the experimental group, which received 12 online weekly yoga sessions and a regimen of daily home practice 6 days a week, or the waitlisted control group, which continued their regular daily routines without the intervention. The effectiveness of the intervention was measured using Maslach's Burnout Inventory (MBI) and a PQL scale. The study assessed whether a structured yoga program could reduce stress and enhance aspects of PQL, such as compassion satisfaction. The results showed significant differences between the experimental and control groups in all measured outcomes of the MBI and PQL after 12 weeks, with the experimental group showing marked improvements. Specifically, the experimental group exhibited reductions in emotional exhaustion and depersonalization, increases in personal accomplishment and compassion satisfaction, and decreases in burnout and secondary trauma. The study concluded that the 12-week yoga-based intervention effectively managed stress, enhanced resilience, and improved PQoL among HCPs. The findings highlight the potential benefits of integrating yoga-based interventions into healthcare settings to mitigate the adverse effects of burnout on HCPs' decision-making and patient care. The use of mHealth technologies in delivering these interventions could further personalize and enhance the accessibility of yoga practices for HCPs, suggesting a viable and implementable approach to addressing the challenges of burnout in the health-care profession.

## 5. DISCUSSION

Our review has revealed three randomized trials assessing the effects of yoga interventions on physician burnout and two additional trials

involving broader healthcare worker cohorts that include physicians. These studies provide valuable insights into yoga's potential to alleviate burnout symptoms, improve flexibility, and enhance professional fulfillment among medical professionals.

A systematic review by Cocchiara *et al.* broadly examined the use of yoga for managing stress and burnout across healthcare workers, highlighting improvements in stress levels, sleep quality, and overall well-being following yoga interventions.<sup>[40]</sup> However, Cocchiara *et al.* emphasized the need for methodologically robust studies to strengthen the evidence base. Our review focuses on physicians, supplementing Cocchiara *et al.*'s conclusions with comprehensive assessments within this demographic.

For instance, Taylor *et al.* found significant decreases in depersonalization and increases in compassion satisfaction among junior doctors, which is essential for preventing burnout.<sup>[35]</sup> Similarly, Korkmaz *et al.* reported noteworthy reductions in stress, anxiety, and depression, along with improved professional fulfillment and decreased work exhaustion, underscoring the multifaceted benefits of yoga.<sup>[37]</sup> Loewenthal *et al.* evaluated a yoga-based mind-body intervention, revealing significant enhancements in mindfulness, stress management, burnout, and overall well-being, sustained even at a 2-month follow-up.<sup>[36]</sup>

Lin *et al.*'s research demonstrated yoga's effectiveness in reducing work-related stress and enhancing autonomic nerve activity.<sup>[38]</sup> At the same time, Bhardwaj *et al.* highlighted the innovative use of mHealth to deliver yoga-based interventions, showing significant reductions in emotional exhaustion and depersonalization and increases in personal accomplishment and compassion satisfaction.<sup>[39]</sup> These findings reinforce the need to integrate yoga into health-care settings, particularly for physicians who face unique challenges and stressors in their professional lives.

Despite the promising results, several limitations must be acknowledged. The sample sizes of the included studies are generally small, limiting the generalizability of the findings. Including studies involving healthcare workers other than physicians may dilute the specificity of the results for physicians. In addition, significant heterogeneity in the types of yoga interventions used and their duration and frequency make it challenging to standardize the findings. The variability in outcome measures across studies further complicates the synthesis of evidence.

Another limitation is the potential for selection bias, as participants who opt into yoga studies may already have a predisposition towards or interest in alternative health practices. The lack of long-term follow-up data in most studies prevents a thorough understanding of the sustained effects of yoga interventions on physician burnout. Furthermore, while some studies have explored the feasibility of virtual or mHealth-supported yoga interventions, more research is needed to confirm their effectiveness and practicality in real-world settings.

To strengthen the evidence base, it is imperative that future research focuses on conducting larger, more rigorously designed randomized controlled trials that exclusively target physician populations. Standardizing the yoga interventions in terms of duration, frequency, and content will help in comparing outcomes across different studies more effectively. Long-term follow-up assessments are essential to evaluate the sustainability of the benefits observed with yoga interventions.

By exploring the integration of yoga into comprehensive wellness programs for physicians, we can potentially unlock a powerful tool in the fight against burnout. This approach, alongside other stress

reduction and burnout prevention strategies, could significantly improve the well-being of health-care professionals. Given the feasibility challenges highlighted in some studies, future research should also investigate the implementation of virtual yoga sessions and mHealth technologies to enhance accessibility for busy healthcare professionals. This approach aligns with the growing trend toward digital health solutions and can help overcome barriers related to time and location.

In addition to quantitative measures, incorporating qualitative feedback from participants about their experiences and perceived benefits of yoga can provide a more holistic understanding of its impact. Understanding the mechanisms by which yoga alleviates burnout, including physiological and psychological pathways, can further strengthen the case for its inclusion in physician wellness programs.

Overall, a multifaceted research approach that combines rigorous quantitative analysis with qualitative insights and explores innovative delivery methods will be crucial in advancing our understanding of yoga's potential to mitigate physician burnout and improve overall well-being. Integrating yoga into daily routines can be particularly beneficial for healthcare professionals, enhancing their capacity to provide high-quality care and improving patient outcomes.

## 6. CONCLUSION

This review establishes that yoga is promising for mitigating burnout symptoms, enhancing flexibility, and fostering professional fulfillment among physicians. The randomized trials analyzed indicate that yoga interventions can effectively reduce emotional exhaustion and depersonalization while improving compassion satisfaction and personal accomplishment. These encouraging outcomes suggest that integrating yoga into health-care settings could contribute significantly to the resilience and effectiveness of health-care professionals. Furthermore, incorporating mHealth technologies can enhance the accessibility and adaptability of yoga-based interventions, making them more practical for busy HCPs. However, it is still necessary to conduct more extensive, methodologically rigorous studies to validate these findings and explore the long-term effects of yoga on physician burnout. By addressing physicians' physical, emotional, and mental needs, we can increase their ability to provide high-quality care and improve patient outcomes. In the future, research should concentrate on optimizing yoga-based interventions and integrating them into comprehensive wellness programs to support the well-being of health-care professionals.

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All the authors contributed equally in design and execution of the article.

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## 11. CONFLICTS OF INTEREST

Nil.

## 12. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

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**Table 1:** Summary of Reviewed Studies on Yoga Interventions for Physician Burnout

Study	Sample size and population	Intervention	Duration and frequency	Key outcomes	Limitations
Taylor <i>et al.</i> (2020)	30 junior doctors	Trauma-informed yoga versus group fitness activities	8 weeks, weekly sessions	Significant reduction in depersonalization, increased compassion satisfaction, improved flexibility	Small sample size, resource-intensive personalized sessions
Loewenthal <i>et al.</i> (2021)	44 resident physicians	Yoga-based mind-body intervention (RISE)	6 weeks, weekly sessions	Significant improvements in mindfulness, stress levels, burnout, and overall well-being	Low in-person session attendance, feasibility rated higher for virtual sessions
Korkmaz <i>et al.</i> (2024)	129 practicing physicians	Sudarshan Kriya Yoga (SKY) versus stress management education	Not specified	Significant reductions in stress, anxiety, depression; improved professional fulfillment, reduced work exhaustion	No significant impact on professional errors, generalizability may be limited
Lin <i>et al.</i> (2015)	50 mental health professionals (included physicians)	12-week yoga program	12 weeks, weekly sessions	Significant reduction in work-related stress, improved stress adaptation, increased autonomic nerve activity	Not specific to physicians, limited sample size
Bhardwaj <i>et al.</i> (2023)	98 healthcare providers (included physicians)	12-week yoga intervention with mHealth support	12 weeks, weekly sessions + daily home practice	Significant reductions in emotional exhaustion, depersonalization; increased personal accomplishment, compassion satisfaction	mHealth technology integration complexity, not exclusively physicians