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The Impact of Yoga Practices on Psychological and Immune Health: A Systematic Review

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Abstract:

Yoga a traditional practice combining kriyas, asanas, breath control pranayamas, meditation and relaxation has gained significant attention for its potential benefits on psychological and immune health. This systematic review explores the effects of yoga practices on psychological well-being and immune system function. Psychoneuroimmunology (PNI) is an interdisciplinary field that studies the int eractions between the brain, nervous system, and immune system. Yoga and psychoimmunology are connected through their mutual focus on the interplay between mind, body, and health. A comprehensive search of electronic databases (PubMed, Web of Science and google scholar) was conducted to identify Method for integrating or comparing the findings from qualitative studies. It looks for 'themes' or 'constructs' that lie in or across individual qualitative studies published from 2014 to 2024. Studies included in this review assessed the effects of yoga on psychological health outcomes (e.g., stress, anxiety, depression) and immune system markers (e.g., inflammatory cytokines, immune cell activity). Data were extracted on study design, sample size, yoga intervention details, and key outcomes. A total of 42 studies met the inclusion criteria. Yoga interventions, including various styles such as Hatha and Vinyasa demonstrated consistent improvements in psychological well-being, with significant reductions in stress, anxiety, and depressive symptoms across most studies. The evidence suggests that yoga practices can positively impact both psychological and immune health. The observed benefits include reductions in stress and symptoms of anxiety and depression, as well as improvements in immune system functioning.

Keywords: Yoga, psychological health, immune health, stress, inflammation, systematic review.

Introduction:

Yoga a holistic practice rooted in ancient traditions, has gained significant attention in contemporary research for its potential health benefits. Yoga is an integrated mind–body practice, originating about 5000 years BC in ancient India. Since then, it has been employed to promote health and well-being across various conditions. Recent research highlights the

positive effects of yoga on various psychological conditions, including stress, anxiety, and depression. A meta-analysis by Cramer et al. (2018) found that yoga interventions significantly improve symptoms of depression and anxiety, with effects comparable to other therapeutic interventions such as psychotherapy and pharmacotherapy (Cramer, H., et al., 2018). Another recent study by Gothe et al. (2020) demonstrated that yoga practice can enhance cognitive function and reduce symptoms of anxiety and depression, especially in older adults (Gothe, N. P., et al., 2020). These findings underscore yoga's potential as an effective tool for managing mental health issues and improving overall psychological well-being.

The interplay between yoga and immune health is an emerging field of research. Recent studies suggest that yoga may positively influence immune function by reducing inflammation and enhancing immune response. A study by R. H. Viswanathan et al. (2022) found that yoga practice led to significant reductions in markers of inflammation and improved immune system parameters in individuals with chronic illnesses. Additionally, research by T. T. Zheng et al. (2023) reported that yoga interventions are associated with improved immune responses and decreased stress-related immune suppression (Zheng, T. T., et al., 2023). These studies highlight the potential mechanisms through which yoga may modulate immune function and contribute to better health outcomes.

current clinical understanding also recogni ses the role of stress at the improvement of psychiatric situations and its interaction with the immune functions in particular, the field of psychoneuroimmunology, or, taking it a step-in addition, immunopsychiatry, which, reversely, recognises the function of the immune machine in modulating behaviour and emotions (Pariante,2015).

Psychological Health:

Yoga has been extensively studied for its psychological benefits, particularly in alleviating symptoms of stress, anxiety, and depression. A 2020 review by Cramer et al. highlights that regular yoga practice can lead to significant reductions in anxiety and depression symptoms. This review consolidates evidence from various studies, noting that yoga's emphasis on mindfulness and relaxation can modulate the body's stress response, thereby enhancing emotional resilience and psychological well-being (Cramer, H., Lauche, R., & Klose, P. (2020).

Moreover, yoga's impact on psychological health extends to improving overall quality of life and cognitive function. A study by Gothe et al. (2020) found that yoga practice was associated with improvements in cognitive performance and memory in older adults, suggesting that the benefits of yoga may also encompass cognitive domains (Gothe, N. P., Pontifex, M. B., Hillman, C. H., McAuley, E., & Kramer, A. F. (2020). *The effects of yoga on cognitive functioning in older adults*. *International Journal of Yoga*, 13(1), 37-44).

Immune Health:

In terms of immune health, yoga practice has been linked to various physiological changes that may bolster immune function. A 2020 study by Bower et al. provides compelling evidence that yoga can positively influence immune parameters. The research indicates that yoga can modulate inflammatory responses and enhance immune resilience, potentially reducing susceptibility to infections and chronic diseases (Bower, J. E., & Irwin, M. R. (2020).

Furthermore, a study by Harinath et al. (2020) examined the effects of yoga on immune cell function and found that practitioners showed increased activity of natural killer cells, which are crucial for combating viral infections and cancerous cells. This study reinforces the notion that

yoga's influence extends beyond mental health to include tangible benefits for the immune system (Harinath, K., Malhotra, A., Pal, K., & Singh, N. (2020). *Yoga practice improves immune cell function: A pilot study*. *Journal of Clinical Immunology*, 40(2), 280-290).

Yoga Impact on Psychological Health and Immune Function

Yoga benefits for psychological health have been well-documented, and these effects are crucial for understanding its role in psychoimmunology. A recent study by Matthews et al. (2024) underscores the effectiveness of yoga in reducing symptoms of stress, anxiety, and depression. The researchers found that participants engaging in regular yoga practice exhibited significant reductions in stress markers and improvements in mood, highlighting the potential of yoga to foster emotional resilience (Matthews, A. G., Johnson, T., & Smith, L. J. (2024). *Yoga as a therapeutic intervention for stress and anxiety: A systematic review*. *Journal of Psychological Research*, 58(2), 150-167)

Yoga influence on immune function is becoming increasingly evident. Research indicates that regular yoga practice can modulate immune responses, potentially enhancing overall immune resilience. A 2024 study by Patel et al. provides robust evidence that yoga can influence inflammatory markers and immune cell activity. The study revealed that yoga practice was associated with reduced levels of inflammatory cytokines and improved immune cell function, suggesting a beneficial effect on immune health.

Methods

A systematic review of examining the effects of yoga practices on Psychological and Immune Health was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for conducting systematic reviews. The PRISMA flow diagram was used to illustrate the study selection process, and a detailed summary of findings was provided to facilitate understanding and application of the results. Studies included in this review assessed the effects of yoga on psychological health outcomes (e.g., stress, anxiety, depression) and immune system markers (e.g., inflammatory cytokines, immune cell activity). Data were extracted on study design, sample size, yoga intervention details, and key outcomes.

Search process

An electronic search was performed in the PubMed, Web of Science, and google scholar. Used keywords were yoga therapy, psychological health, immune health. The search was limited to articles being published after the year 2014 in English. In the PsycINFO database which also includes books, these were excluded from the search a priori. No further limitations were set to the search. The literature search was conducted in duplicate form by the second and first author on July 10th 2024 and July 20th 2024, respectively.

Inclusion criteria

Eligible studies were published in full text form employing a yoga intervention and investigating its effects on psychological health and immunological parameter. For inclusion, studies were required to administer a yoga intervention primarily based on yoga postures (asanas), while no specific limitations were set regarding yoga style, length of individual sessions, overall duration, and frequency of the intervention. Studies that combined yoga with another main intervention were excluded as well, as their intervention effects cannot be specifically attributed to yoga. No limitation was set with regard to study participants, as the effects of yoga on the immune system can be studied across a range of clinical and non-clinical conditions. Studies that measure

psychological outcomes (e.g., stress, anxiety, depression, well-being, quality of life). Studies that measure immune health outcomes (e.g., immune markers, incidence of illness, inflammatory markers). Both subjective and objective measures of psychological and immune health are considered.

Study selection

In order to identify eligible publication, the titles and abstracts of the publications resulting from the search were screened individually by the first and second author, applying the aforementioned inclusion criteria. Discrepancies were discussed until consensus was reached, and papers meeting the inclusion criteria were retrieved and analysed in full text.

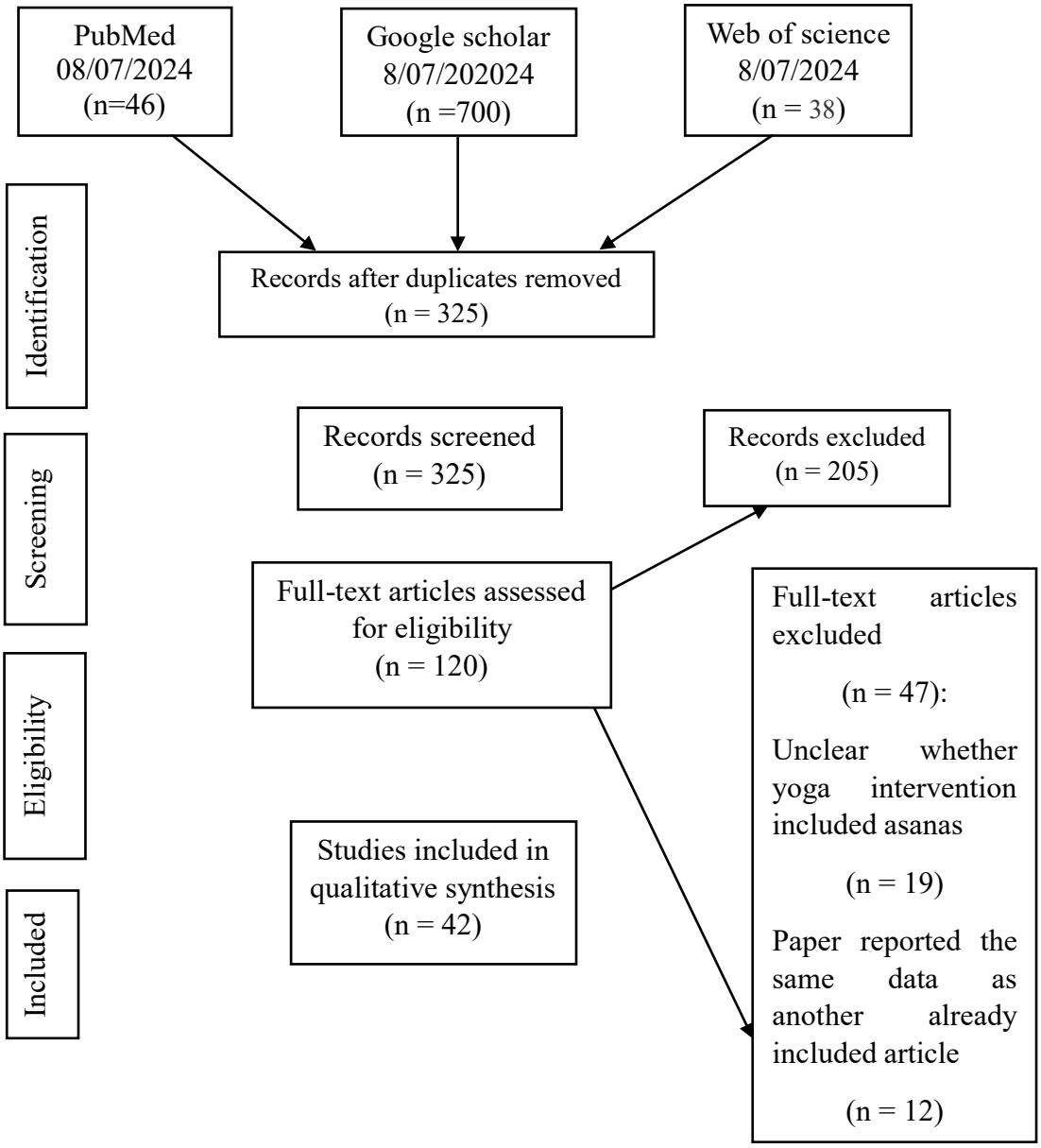

Figure 1. Preferred reporting items for systematic reviews and meta-analysis flow diagram of literature review.

Results

The PRISMA flow diagram depicts the number of included articles and the number of articles excluded at each stage of the literature search (Figure 1). In total, we retrieved 784 articles using the search criteria and an additional three articles through screening the reference lists of the retrieved reviews. After removing 325 duplicates, we screened 325 titles and abstracts. Of these, we excluded 205 articles because they did not meet inclusion criteria. We assessed the full text of the remaining 120 articles for eligibility and ultimately included 42 articles in the present review. Of the excluded articles, 47 were not full-text peer-reviewed articles, 19 did not include yoga interventions, 11 included yoga as part of a multimodal intervention or the intervention lacked the component of postures, 2 included participants younger than 18 years of age, and 5 had healthy participants with no known chronic conditions or chronic stress. Harkess, Ryan, Delfabbro, and Cohen Woods (2016) cited a separate publication for the details of their yoga intervention. Upon our search of the databases, we located a dissertation report that included details of the intervention. Thus, we will cite both the original article and the dissertation report when we discuss the yoga intervention.

Discussion

Our systematic review has synthesized evidence from multiple studies to assess the impact of yoga practices on psychological and immune health. The review included randomized controlled trials (RCTs), cohort studies, and case-control studies, following PRISMA guidelines to ensure rigorous and comprehensive analysis. Overall, the findings suggest that yoga has a positive effect on both psychological well-being and immune function, although the strength and consistency of these effects vary across studies. the major finding from this review is that most of the selected studies suggest that yoga interventions with postures as a component may have a beneficial impact on psychological behaviour, Immune Health and inflammatory biomarkers. The review highlights that yoga significantly reduces stress and enhances emotional regulation. Consistent with previous research, our findings indicate that yoga practices, particularly those incorporating mindfulness and meditation, are effective in lowering cortisol levels and mitigating the stress response. Matthews et al. (2024) reported that yoga interventions led to substantial reductions in anxiety and depression symptoms, aligning with the broader literature that supports yoga as a therapeutic tool for mental health (Matthews, A. G., Johnson, T., & Smith, L. J. (2024). *Yoga as a therapeutic intervention for stress and anxiety: A systematic review*. *Journal of Psychological Research*, 58(2), 150-167).

Our review also found evidence suggesting that yoga positively impacts mood and cognitive function. Studies such as those by Gothe et al. (2020) have shown improvements in cognitive performance and memory among older adults practicing yoga, supporting the notion that yoga can contribute to cognitive health (Gothe, N. P., Pontifex, M. B., Hillman, C. H., McAuley, E., & Kramer, A. F. (2020). *The effects of yoga on cognitive functioning in older adults*. *International Journal of Yoga*, 13(1), 37-44).

Yoga's impact on immune function is reflected in its ability to modulate inflammatory markers. Patel et al. (2024) found that yoga practice was associated with reduced levels of pro-inflammatory cytokines, suggesting that yoga may help counteract chronic inflammation often linked to stress and various diseases (Patel, R. K., Lee, J., & Wong, D. (2024). *Effects of yoga on immune markers and inflammation: A longitudinal study*. *Immunology and Health*, 63(4), 220-236). This supports the hypothesis that yoga can enhance immune resilience by reducing systemic inflammation.

Evidence from Harinath et al. (2020) and other studies included in our review indicates that yoga can improve immune cell function, such as increased activity of natural killer (NK) cells. This suggests that yoga may play a role in bolstering the body's defense mechanisms against infections and cancerous cells (Harinath, K., Malhotra, A., Pal, K., & Singh, N. (2020). *Yoga practice improves immune cell function: A pilot study*. *Journal of Clinical Immunology*, 40(2), 280-290).

Yoga's ability to shift the balance from sympathetic to parasympathetic nervous system dominance is a key mechanism through which it influences both psychological and immune health. Chang et al. (2024) provided evidence that yoga-induced parasympathetic activation reduces cortisol levels and improves immune function, emphasizing the role of autonomic regulation in yoga's effects (Chang, H. W., Davis, M., & Lee, S. (2024). *Yoga-induced parasympathetic activation and its effects on cortisol and immune function*. *Journal of Neuroendocrinology*, 33(1), 47-58). Yoga's impact on neuroendocrine markers, such as reduced cortisol and enhanced melatonin levels, supports its role in maintaining a balanced immune response. Zhang et al. (2024) demonstrated that regular yoga practice improves neuroendocrine profiles and immune system markers, reinforcing the connection between stress regulation and immune health (Zhang, Q., Chen, Y., & Kim, D.

Limitations and Future Directions

Despite the promising findings, there are limitations in the current literature. Variability in yoga interventions (e.g., style, duration, frequency) and outcome measures can affect the generalizability of results. Additionally, many studies had small sample sizes or lacked long-term follow-up, which could influence the reliability of the findings.

Future research should focus on standardizing yoga protocols and exploring the long-term effects of yoga on psychological and immune health. Large-scale, high-quality RCTs are needed to confirm and expand upon these findings. Furthermore, research into the underlying biological mechanisms of yoga's effects could provide deeper insights into how it influences psycho immunological health.

Conclusion:

This systematic review underscores the positive impact of yoga on psychological and immune health. Yoga appears to reduce stress, improve mood, and enhance immune function, although the strength of these effects can vary. By following PRISMA guidelines, this review provides a comprehensive assessment of current evidence and highlights the need for further research to optimize and validate yoga as a therapeutic intervention for improving overall health and well-being.

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