E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/16.01.95

Research Article

Yoga as an Adjunct Treatment in Rheumatoid Arthritis: A Narrative Review of Psycho-Neuro-Immune Interactions in the Indian Context

Dr. Fareha Husain[1*], Prof. Rajni Patel[2], Shiza Khan[3]
[1*]Assistant Professor, Department of Physiology, VALASMC, Etah, India.
[2]Professor, Department of Anatomy, VALASMC, Etah, India.
[3]2nd Year MBBS, Jawaharlal Nehru Medical College (JNMC), AMU, Aligarh, India.
Corresponding Author: Dr. Fareha Husain
Received: 05.01.26, Revised: 04.02.26, Accepted: 07.03.26

ABSTRACT
Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease of the joints and systemic health. In India and worldwide, the incidence of RA is increasing. The traditional treatments are NSAIDs, corticosteroids, and DMARDs, but rceebtly there have been some non-pharmacological approaches such as yoga that have also been found to be beneficial.
Objectives – To assess the therapeutic outcomes of yoga on RA based on its effect on inflammation, psychological stress, and psycho-neuro-immune modulation.
Methods – This narrative review integrates evidence from eight prominent papers on RA and yoga. Databases such as PubMed, Scopus, and Google Scholar were searched using English-language articles from 2000 to 2024. Studies exploring biological, psychosocial, and clinical outcomes of yoga in RA patients were included.
Results – Yoga enhances joint flexibility, immune status, and decreases inflammatory cytokines (IL-6, IL-17A, TNF-α), stress hormones (cortisol), and improves quality of life. Molecular markers such as BDNF, TGF-ß, and HLA-G also alter in a positive direction with yoga. Significant reductions in anxiety, depression, and pain scores were observed.
Conclusion – Yoga is a cost-effective, non-pharmacological, and an effective adjunct that can significantly enhance RA outcomes through psycho-neuro-immune mechanisms. Further long-term, deeply analysing research is indicated.

Keywords: Rheumatoid Arthritis, Yoga, Psycho-Neuro-Immune Axis, HPA Axis, Inflammation, Indian Context, Cortisol, IL-6, TGF-ß, HLA-G, Quality of Life.

INTRODUCTION

Rheumatoid arthritis (RA) is not merely a joint disorder. It is an autoimmune disease with a multifaceted nature that not only impacts the synovial joints but also other organ systems and is characterized by persistent inflammation. About 1% of individuals globally are afflicted with RA, and it is thus a significant public health concern (CDC, 2023). India bears a significant burden. In women aged between 30 and 50 years, who are disproportionately burdened and usually at their prime, the economic burden is poorer (Malaviya et al., 1993). As a result of delayed diagnosis, unequal access to healthcare, and the costliness of advanced treatments, the treatment of RA is particularly challenging in rural and underdeveloped regions.

Immune dysregulation by triggered T cells and inflammatory cytokines like TNF-α, IL-6, and IL-17A form the pathophysiology of RA (Guo et al., 2018). This immune reaction is not only localized within the joints but also mediated by systemic mechanisms through the neuroendocrine pathway. Chronic stress, common in RA patients, worsens the disease by dysregulating the HPA axis. This causes cortisol resistance, increased sympathetic activity, and persistent inflammation (Koopman et al., 2016; Guo et al., 2018). These interactions prove the requirement of the necessity of treatment interventions beyond the management of symptoms targeting the larger psycho-neuro-immune network.

Based on its deep Indian philosophical and cultural roots, yoga is such an intervention. It provides a lor of benefits like ways to harmonize body and mind, it integrates physical postures (asanas), breath control (pranayama), and meditation (dhyana). Scientific interest in yoga has expanded exponentially over the past 20 years. Recently, researchers are keen to explore the influence of yoga on mental well-being, neurohormonal regulation, and molecular indicators- all being

immediately related to RA pathogenesis (Tolahunase et al., 2018).

The subject of the present review is to look at how yoga influences RA through the psycho-neuro-immune axis, with an emphasis on the Indian context where its integration into medicine could possess cultural as well as economic advantages.

METHODS

We conducted a comprehensive narrative review to gather and synthesize findings on the role of yoga in RA, particularly its influence on immune modulation, neuroendocrine function, and psychological well-being. Relevant literature between 2000 and 2024 from databases including PubMed, Scopus, and Google Scholar were searched and included.

Inclusion Criteria

- Studies involving human subjects with RA undergoing yoga interventions
- Studies that present results pertaining to biological markers (e.g., IL-6, TNF-α, cortisol), neuroendocrine shifts, or psychological functioning
- Clinical trials evaluating functional outcomes, quality of life, or treatment compliance

Exclusion Criteria

- Publications in a language other than English
- Studies that are not RA-specific
- Yoga interventions that were not operationalized or were poorly described

Out of the initial set of more than 100 articles, eight excellent quality studies qualified for inclusion. Special emphasis was laid on trials done in Indian populations or Indian settings to keep the cultural and geographical context relevant.

Main Body

Epidemiological and Cultural Landscape in India

Treatment of long-term diseases such as RA poses special challenges to the Indian health system. Urban areas are the first line for specialized care, while vast rural tracts still have insufficient access. Individuals access over-the-counter medications, including corticosteroids, or go to traditional systems of medicine such as Ayurveda and Unani due to economic reasons. Due to this, yoga, which originated in India and is cost-effective, is a good complementary therapy.

Recently, some of the indian states have also been actively moving to incorporate yoga into public health programs under state-funded wellness programs. Many of the most prestigious institutes like All India Institute of Medical Sciences (AIIMS) and the National Institute of Mental Health and Neurosciences (NIMHANS) have run pilot studies and developed clinical modules of yoga specifically for chronic diseases, such as rheumatoid arthritis (RA), with surprisingly positive findings. These courses focus a lot on mental and emotional well-being, and not just the area of physical rehabilitation, thus highlighting yoga's multi-faceted values

Also, the Ministry of AYUSH is an active promoter of the utilization of yoga via national campaigns, educational outreach, and establishment of standardized, evidence-based protocols. As a result when combined, these initiatives are continuously integrating yoga into India's mainstream healthcare system, where it is being increasingly promoted not only as a tradition, but as a scientifically backed, culturally relevant therapeutic choice.

Psycho-Neuro-Immune Axis and RA

A major key factor widely understood in systemic inflammation is chronic psychological stress which is largely a result of its disturbing action on the hypothalamic-pituitary-adrenal (HPA) axis and a simultaneous decrease in parasympathetic nervous system tone. In RA patients, dysregulation of this kind imposes a biochemical milieu conducive to disease activity and recurrence of inflammatory flares (Koopman et al., 2016).

The picture is also compounded by persistently low vagal tone, a physiological indicator of reduced parasympathetic activity, which has been often reported in patients with RA. Reduced vagal tone is closely associated with worsening disease severity, joint damage, and fatigue. It has been shown through research that the activation of the vagus nerve, either by behavioral interventions like deep breathing or clinical means, is capable of reducing pro-inflammatory cytokine levels such as tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) (Koopman et al., 2016).

The theory of a bi-directional mind-body link in RA etiology is strong supported by these results which also emphasize the importance of investigating non-pharmacological treatment modalities addressing this psycho-neuro-immune interface.

Clinical Effects of Yoga in RA

Increasing amounts of clinical trials have established the possible benefits of yoga in patients with rheumatoid arthritis (RA). For instance, a pilot study conducted by Evans et al. (2011) reported that Iyengar yoga enhanced physical functioning, mood, and general well-being in participants. Another study was seen where Tolahunase et al. (2018) in an Indian context demonstrated that 12 weeks of yoga and meditation increased sleep, decreased fatigue, and reduced NSAID requirements. So we can see that these are some valuable findings with the long-term complexities of RA and side effects of continuous use of medication.

Yoga asanas facilitate joint mobility and flexibility without being strenuous enough for inflamed joints. In combination with pranayama and meditation, yoga regulates stress, enhances emotional health, and encourages a perception of control- essential to coping with the physical and mental weight of a chronic autoimmune illness.

Molecular and Hormonal Impact

The molecular actions of yoga provide strong evidence for its therapeutic potential as an adjunct therapy for rheumatoid arthritis. In research conducted by Gautam et al. (2019), yoga practice resulted in a substantial reduction in the levels of important pro-inflammatory cytokines like IL-6, IL-17A, and TNF-α, which play an important role in the pathogenesis of RA. Simultaneously, there was a rise in brain-derived neurotrophic factor (BDNF), reflecting increased neural resilience, flexibility, and likely better coping skills under chronic inflammatory stress (Tolahunase et al., 2018; Gautam et al., 2019).

In addition, yoga was found to normalize cortisol levels- commonly raised because of persistent stress- indicating a readjustment of the hypothalamic-pituitary-adrenal (HPA) axis and transition towards neuroendocrine homeostasis. Notably, yoga's influence also triggered expression of immunomodulatory molecules like transforming growth factor-beta (TGF-β) and human leukocyte antigen-G (HLA-G). These molecules play critical roles in suppressing overactivity of immunity; TGF-β induces regulatory T-cell differentiation that suppresses inflammation, whereas HLA-G facilitates immune tolerance and cellular peacekeeping (Gautam et al., 2019).

Besides, oxidative stress- commonly held responsible for joint destruction and body damage in RA- also experienced a significant decline in those practicing yoga. Oxidative biomarkers including 8-hydroxy-2'-deoxyguanosine (8-OHdG) and reactive oxygen species (ROS) were reduced, along with an increase in total antioxidant capacity.

Yoga's Integration into Indian Healthcare

As we all know about yoga's cultural familiarity, affordability, and minimal infrastructure needs, it is exceptionally well-suited to low-resource settings such as many parts of India. By providing community health workers and trained yoga instructors with structured, evidence-based modules, we can work on extending its therapeutic benefits to underserved and remote populations.

Additionally, within the Indian context, group yoga classes offer benefits beyond the physical- they offer an environment of safety and support in which people, especially women (who disproportionately suffer from RA), are recognized and brought to empowerment along with relaxation of the mind.

DISCUSSION

The review after analysing a multitude of researches, affirms that yoga holds substantial promise as a complementary approach in the management of RA. Distinguished from pharmacological treatments that often address symptoms or singular biological pathways, yoga offers a comprehensive intervention that simultaneously impacts psychological, neuroendocrine, and immunological domains. An approach like this is especially relevant in India, where economic constraints and cultural preferences necessitate holistic and low-cost healthcare options.

Even then with the current evidences analysed which are encouraging, this new approach has certain limitations. Quite a few of the studies in this area suffer from small sample sizes and lack long-term follow-up. Standardization of yoga protocols, frequency, and intensity is also needed. Something much needed is that the future researches should prioritize randomized controlled trials (RCTs) with both objective (e.g., cytokine levels, radiographic scores) and subjective (e.g., pain scales, depression inventories) outcome measures.

CONCLUSION

As we can conclude, yoga represents a time-tested, culturally resonant, and evidence-backed adjunct in the management of RA.

Through its positive influences on the psycho-neuro-immune axis, it alleviates inflammation, improves neuroendocrine function, and enhances mental well-being. In India particularly, where accessibility and affordability remain barriers to optimal RA care, yoga offers a sustainable and scalable solution.

REFERENCES

1. CDC. (2023). *Arthritis-Related Statistics*. Centers for Disease Control and Prevention. https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm
2. Evans, S., Moieni, M., Taub, R., Subramanian, S. K., Sternlieb, B., Zeltzer, L., et al. (2011). Iyengar yoga for young adults with RA: Results of a mixed-methods pilot study. *Journal of Pain Research*, *4*, 291–301. https://doi.org/10.2147/JPR.S19247
3. Gautam, S., Tolahunase, M., & Dada, R. (2019). Yoga and meditation-based lifestyle intervention for RA: Effects on inflammation and quality of life. *Frontiers in Psychology*, *10*, 2259. https://doi.org/10.3389/fpsyg.2019.02259
4. Guo, Q., Wang, Y., Xu, D., Nossent, J., Pavlos, N. J., & Xu, J. (2018). Rheumatoid arthritis: Pathological mechanisms and modern pharmacologic therapies. *Bone Research*, *6*, 15. https://doi.org/10.1038/s41413-018-0016-9
5. Koopman, F. A., Chavan, S. S., Miljko, S., Grazio, S., Sokolovic, S., Schuurman, P. R., ... & Tracey, K. J. (2016). Vagus nerve stimulation inhibits cytokine production and attenuates disease severity in RA. *Proceedings of the National Academy of Sciences*, *113*(29), 8284–8289. https://doi.org/10.1073/pnas.1605635113
6. Lawrence, R. C., Felson, D. T., Helmick, C. G., et al. (2008). Estimates of the prevalence of arthritis and other rheumatic conditions. *Arthritis & Rheumatism*, *58*(1), 26–35. https://doi.org/10.1002/art.23176
7. Malaviya, A. N., Kapoor, S. K., Singh, R. R., Kumar, A., & Pande, I. (1993). Prevalence of rheumatoid arthritis in the adult Indian population. *Rheumatology International*, *13*(4), 131–134. https://doi.org/10.1007/BF00301075
8. Tolahunase, M. R., Sagar, R., & Dada, R. (2018). Impact of yoga and meditation on cellular aging in RA patients. *Frontiers in Psychiatry*, *9*, 61. https://doi.org/10.3389/fpsyt.2018.00061
9. Patanjali. (200 BC). *The Yoga Sutras*.