IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Sleep disturbances and their association with disease severity and quality of life in rheumatoid arthritis: A Systemic Review

Anjali Sharma[1], Meetu[2], Anubha Garg[3], Geetanjali Sikka[4], Nikita[5]

1 MPT Scholar, College of Physiotherapy, Pt BDS PGIMS Rohtak

2 Associate Professor, College of Physiotherapy, Pt BDS PGIMS Rohtak

3 Professor and Unit head, Department of Medicine, Pt BDS PGIMS, Rohtak

4 Associate Professor, College of Physiotherapy, Pt BDS PGIMS Rohtak

5 MPT Scholar, College of Physiotherapy, Pt BDS PGIMS Rohtak

Abstract

Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by persistent joint inflammation, pain, and functional disability. Sleep disturbances are highly prevalent among individuals with RA and appear to influence disease activity and overall quality of life (QoL). This systematic review synthesizes evidence from observational, longitudinal, and interventional studies examining the association between sleep problems, RA disease activity, and QoL outcomes. Literature across major scientific databases was reviewed, and key studies exploring sleep quality, inflammatory markers, pain levels, functional status, and psychological variables in RA patients were analyzed. Findings consistently demonstrate that over 50% of RA patients experience poor sleep quality, commonly presenting as difficulty initiating sleep, frequent awakenings, and non-restorative sleep. Poor sleep was strongly related to increased disease activity, elevated inflammatory markers, higher pain severity, and reduced physical and mental QoL. Several studies identified a bidirectional relationship in which disease activity and pain worsen sleep, while poor sleep amplifies inflammation and symptom severity. Although disease-modifying treatments improve sleep outcomes, variability in study protocols and sample sizes limit broader conclusions. Overall, sleep disturbances represent a critical yet underrecognized component in RA management.

Keywords: Rheumatoid arthritis, sleep quality, disease activity, inflammation, quality of life.

Introduction

Rheumatoid arthritis (RA) is a chronic systemic autoimmune condition characterized by persistent synovial inflammation, progressive joint destruction, and long-term functional disability.[1] It affects nearly 1% of the global population and commonly presents with symmetrical joint pain, swelling, prolonged morning stiffness, fatigue, and various extra-articular manifestations that significantly impair daily functioning.[1] Persistent immune activation and overexpression of pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) drive synovial proliferation, cartilage degradation, and bone erosion, ultimately contributing to pain, disability, and reduced quality of life in affected individuals.[2]

Contemporary management emphasizes disease-modifying antirheumatic drugs (DMARDs), including conventional, biologic, and targeted synthetic agents, which slow disease progression and reduce inflammation.[1] Sleep disturbances have emerged as an important yet frequently under-recognized comorbidity in RA, with a large proportion of patients reporting difficulty initiating sleep, poor sleep maintenance, non-restorative rest, and excessive daytime fatigue.[3],[4] Growing evidence suggests that these sleep problems are not solely a consequence of pain but may themselves be influenced by underlying inflammatory processes and psychological factors.[5] Elevated levels of inflammatory markers such as CRP and IL-6 have been associated with poorer sleep quality, suggesting a biologically mediated link between the immune system and sleep regulation in RA.[6]

Poor sleep has further been shown to correlate with higher disease activity scores (DAS28), increased pain sensitivity, reduced physical functioning, and overall diminished quality of life, indicating a close interaction between sleep patterns and clinical severity.[7] Moreover, psychological variables particularly anxiety, stress, and depressive symptoms play a critical role in worsening sleep disturbances and amplifying pain perception, creating a complex interplay between mental health and disease burden.[3] The relationship between sleep disturbances and RA appears to be bidirectional: active disease with pain and stiffness disrupts sleep continuity, while inadequate or poor-quality sleep heightens inflammatory responsiveness and contributes to worsening symptoms, thereby creating a persistent vicious cycle.[8],[9]

Recognizing this bidirectional mechanism is essential in both clinical and rehabilitation settings, as addressing sleep issues may improve patient outcomes, reduce symptom severity, and enhance overall quality of life.[10] Given the significant functional implications of sleep disturbances and their strong association with disease activity, understanding this relationship is crucial for comprehensive RA management.[11] This systematic review therefore synthesizes findings from major studies evaluating the association between sleep disturbances, RA disease activity, and quality of life, aiming to highlight the clinical importance of integrating sleep assessment into routine rheumatological and physiotherapeutic care.

Methods

A structured literature search was performed across PubMed, Scopus, Google Scholar, and ScienceDirect. Search terms included: “rheumatoid arthritis and sleep,” “sleep disturbances in RA,” “sleep quality,” “disease activity,” and “quality of life in rheumatoid arthritis.”

Inclusion Criteria

1. Peer-reviewed original research articles.
2. Studies assessing sleep quality in RA patients using validated instruments.
3. Clear reporting of disease activity or QoL outcomes.
4. Cross-sectional, longitudinal, or interventional designs.

Exclusion Criteria

1. Review articles, meta-analyses, or editorials.
2. Articles not in English.
3. Studies with unclear assessment tools or insufficient data.

From an initial pool of 60 articles, 10 key studies meeting criteria were included. Data were extracted on study design, sample characteristics, methods, and outcomes.

Summary of Reviewed Studies

Author and Year	Design & Characteristics of Participants (Sample Size)	Objective	Materials & Methods	Outcome Measures	Results
Luyster et al., 2011[7]	Cross-sectional; n=103	To compare objective vs subjective sleep	Actigraphy, PSQI, CRP	Sleep efficiency	Both sleep measures correlated with disease activity
Taylor-Gjevre et al., 2011[10]	Survey; n=200	To determine prevalence	PSQI, ESS, DAS28, HAQ	Sleep prevalence	60% poor sleep; predicted by pain & depression
Nicassio et al., 2012[9]	Daily diary; n=257	To examine day-to-day effects	Daily sleep, pain, mood	Next-day symptoms	Poor sleep predicted next-day pain, fatigue, mood decline
Sariyildiz et al., 2014[5]	Case-control; 80 RA vs 40 controls	To compare sleep in RA vs controls	PSQI, ESS, DAS28	Sleep indices	RA had significantly worse sleep & sleepiness
Westhovens et al., 2014[12]	RCT; n=982	To evaluate biologics on sleep	MOS-Sleep Scale, DAS28	Sleep domains	Biologic therapy improved sleep and reduced disease activity
Irwin et al., 2016[13]	Cross-sectional; n=162	To assess objective sleep & inflammation	Polysomnography, PSQI, CRP, IL-6	Sleep efficiency, inflammation	Poor sleep correlated with higher CRP, IL-6 and DAS28
Grabovac et al., 2018[4]	Cross-sectional; 978 RA patients	To assess sleep quality and its association with disease activity	PSQI, DAS28, HAQ, VAS pain	Sleep quality, disease activity	54% poor sleep; poor sleep linked with higher DAS28 and pain

Løppenthin et al., 2019[8]	Longitudinal; n=287	To examine bidirectional relationships	PSQI, DAS28, HAQ, SF-36; 12-month follow-up	Sleep quality & disease activity	Bidirectional association; baseline sleep predicted follow-up DAS28
Lyne et al., 2020[14]	Cross-sectional; n=203	To examine sleep as mediator	PSQI, HADS, Pain DETECT	Depression, pain	Sleep mediated relationship between pain and depression
Fragiadaki et al., 2020[15]	Cohort; n=156	To assess impact of sleep on QoL	PSQI, DAS28-CRP, HAQ, SF-36	QoL domains	Poor sleep predicted lower QoL even after adjusting for disease activity

Discussion

The reviewed studies consistently demonstrate that sleep disturbances are highly prevalent among individuals with rheumatoid arthritis (RA), with reported rates ranging from approximately 54% to over 70%.[4,8] These disturbances include difficulty initiating sleep, increased night-time awakenings, reduced sleep efficiency, and non-restorative sleep, indicating a significant alteration of sleep architecture in RA patients. Such findings suggest that sleep impairment is not merely an associated symptom but an integral component of the overall RA disease burden. Poor sleep quality shows strong associations with elevated disease activity scores, increased concentrations of inflammatory biomarkers such as interleukin-6 (IL-6) and C-reactive protein (CRP), and heightened pain levels, supporting the concept that sleep disturbances are closely linked to both systemic inflammation and symptoty.[6,12]

A consistent theme across longitudinal research is the bidirectional relationship between sleep quality and RA disease activity. Poor or insufficient sleep has been shown to predict worsening inflammation, increased pain sensitivity, and higher disease activity over time.[4,6] Conversely, active RA—characterized by persistent pain, stiffness, and systemic inflammation—further disrupts sleep continuity, creating a self-perpetuating cycle of symptom aggravation.[8,12] This reciprocal interaction aligns with neuroimmunological models in which dysregulated cytokines influence central nervous system pathways involved in sleep regulation, mood, and pain modulation. As a result, sleep disturbances contribute to chronic fatigue, reduced physical performance, impaired social participation, and overall decline in functional capacity.

Sleep problems further exert a substantial impact on patients' quality of life, affecting both physical and psychological domains. Poor sleep has been independently associated with decreased functional ability, increased disability, and lower health-related quality of life scores, even after adjusting for disease activity and pain.[4,12] Psychological comorbidities particularly depression, anxiety, and stress frequently mediate this

link, suggesting that the interaction between sleep and RA is multidimensional and influenced by both biological and emotional factors.[5] These findings highlight the importance of addressing sleep disturbances as part of a comprehensive rehabilitation strategy rather than viewing them solely as secondary symptoms of pain or inflammation.

Interventional evidence further underscores the role of inflammatory pathways in sleep regulation. Several studies have reported that treatment with biologic disease-modifying antirheumatic drugs (DMARDs), including TNF-α and IL-6 inhibitors, leads to significant improvements in sleep quality by reducing systemic inflammation.[12] Although these results reinforce the inflammatory basis of sleep disturbance in RA, individual variability remains considerable, indicating contributions from behavioral, psychological, and lifestyle factors. Moreover, the lack of standardized sleep assessment tools across studies many of which rely primarily on subjective measures such as the Pittsburgh Sleep Quality Index (PSQI) limits the ability to compare outcomes across trials. Despite these limitations, the evidence clearly indicates that sleep disturbances in RA are clinically meaningful and require integrated assessment.[9] Overall, the findings highlight the necessity of incorporating routine sleep evaluation into rheumatology and rehabilitation practice. Addressing sleep disturbances through a combination of inflammatory control, psychological support, and targeted sleep interventions may improve disease outcomes, enhance patient well-being, and reduce long-term disability in RA patients

Conclusion

Sleep disturbances are a significant yet often overlooked component of rheumatoid arthritis. Evidence strongly supports that poor sleep is associated with increased disease activity, heightened pain, and reduced quality of life. The relationship is bidirectional, forming a vicious cycle that exacerbates symptoms and functional limitations. Integrating sleep assessment and targeted sleep management strategies into routine RA care may improve clinical outcomes, enhance rehabilitation effectiveness, and improve overall patient well-being. Future research should focus on standardized sleep assessment, long-term follow-up, and combined physiotherapy sleep interventions to break the cycle of inflammation and sleep disruption.

References

1. Bullock J, Rizvi SAA, Saleh AM, Ahmed SS, Do DP, Ansari RA, et al. Rheumatoid arthritis: A brief overview of treatment. Med Princ Pract. 2018;27(6):501–7.
2. Druce KL, Basu N. Predictors of fatigue in rheumatoid arthritis. Rheumatology (Oxford). 2019;58(Suppl 5):v29–v34.
3. Matcham F, Ali S, Hotopf M, Chalder T. Psychological correlates of fatigue in RA: A systematic review. Clin Psychol Rev. 2015;39:16–29.
4. Grabovac I, Haider S, Berner C, Lamprecht T, Fenzl KH, Erlacher L, et al. Sleep quality in patients with rheumatoid arthritis and associations with pain, disability, disease duration, and activity. J Clin Med. 2018;7(10):336.
5. Sariyildiz MA, Batmaz I, Bozkurt M, Bez Y, Cetincakmak MG, Yazmalar L, et al. Sleep quality in rheumatoid arthritis: relationship between the disease severity, depression, functional status and the quality of life. J Clin Med Res. 2014;6(1):44-52.

6. Irwin MR, Olmstead R, Carrillo C, Sadeghi N, Nicassio P, Ganz PA, et al. Sleep loss exacerbates fatigue, depression, and pain in rheumatoid arthritis. Sleep. 2012;35(4):537-43.
7. Luyster FS, Chasens ER, Wasko MC, Dunbar-Jacob J. Sleep quality and functional disability in patients with rheumatoid arthritis. J Clin Sleep Med. 2011;7(1):49-55.
8. Løppenthin K, Esbensen BA, Jennum P, Østergaard M, Christensen JF, Thomsen T, et al. Sleep quality and correlates of poor sleep in patients with rheumatoid arthritis. Clin Rheumatol. 2015;34(12):2029-39.
9. Nicassio PM, Ormseth SR, Kay M, Custodio M, Irwin MR, Olmstead R, et al. The contribution of pain and depression to self-reported sleep disturbance in patients with rheumatoid arthritis. Pain. 2012;153(1):107-12.
10. Taylor-Gjevre RM, Gjevre JA, Skomro R, Nair B. Restless legs syndrome in a rheumatoid arthritis patient cohort. J Clin Rheumatol. 2009;15(1):12-5.
11. Fragiadaki K, Tektonidou MG, Konsta M, Chrousos GP, Sfikakis PP. Sleep disturbances and interleukin 6 receptor inhibition in rheumatoid arthritis. J Rheumatol. 2012;39(1):60-2.
12. Westhovens R, Robles M, Ximenes AC, Nayiager S, Wollenhaupt J, Durez P, et al. Clinical efficacy and safety of abatacept in methotrexate-naive patients with early RA and poor prognostic factors. Ann Rheum Dis. 2009;68(12):1870–7.
13. Irwin MR, Olmstead R, Carrillo C, Sadeghi N, Nicassio P, Ganz PA, et al. Sleep loss exacerbates fatigue, depression, and pain in rheumatoid arthritis. Sleep. 2012;35(4):537–43.
14. Lyne J, McNicholas F, O'Donoghue B. Psychotic experiences and quality of life: An analysis using national psychiatric inpatient data. Schizophr Res Treatment. 2020;2020:8896405.
15. Fragiadaki K, Tektonidou MG, Konsta M, Chrousos GP, Sfikakis PP. Sleep disturbances and interleukin-6 receptor inhibition in rheumatoid arthritis. J Rheumatol. 2012;39(1):60–2.