



Effect of Disease Activity on Quality of Sleep in Patients of Rheumatoid Arthritis

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ABSTRACT

Introduction: In this study we sought to study sleep disturbance in patients of RA and co-relation of quality of sleep with disease activity.

Methods: Fifty patients of RA (as per 1987 ACR criteria) with mild to moderate disease activity as per Clinical Disease Activity Index (CDAI) were included. All these patients were also subjected to Pittsburg Sleep Quality Index (PSQI) Questionnaire for self-assessment of sleep disturbances. Pearson and Spearman's co-relation coefficients were used for statistical analysis.

Results: The mean age of the subjects for the study was found to be 44.84 ± 11.608 with male: female ratio of approximately 1:7. The mean CDAI was 16.02 ± 5.626 and mean PSQI score was 8.9 ± 4.156 . Of the total fifty patients evaluated, 37 patients were found to be poor sleepers ($PSQI > 5$ – 74%) and of the seven components of sleep evaluated using PSQI, the most disturbed component of sleep were Sleep Quality and Day time Dysfunction. The co-relation between disease activity and sleep disturbances was found to be statistically significant (P value 0.05).

Conclusion: The study elicited that sleep is a confounding factor in the assessment of disease activity of RA, which is indicated by a significant positive co-relation between sleep disturbances and disease activity. Hence, patients of RA need to be assessed periodically for quality of sleep for better disease management.

Key Words: Rheumatoid Arthritis, Clinical Disease Activity Index, Pittsburg Sleep Quality Index, Sleep Quality.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by proliferative synovitis causing symmetrical polyarticular joint disease with pain, swelling, morning stiffness, and

deformity of multiple joints especially with increased disease activity^[1]. Pain due to severe RA gives sleepless night to a vast majority of patients. In rheumatological condition, nights of poor sleep is usually associated with enhanced

intensity of pain on the next day followed by night of poor sleep and thereby, cause a vicious circle resulting in decrease quality of life and psychological dysfunction^[2,3]. Rheumatoid arthritis and poor sleep quality are also independently associated with impaired immune function and increased circulating pro-inflammatory cytokine levels which are risk factors for further medical and psychiatric co-morbidities like mood changes, depression, increased fatigue and greater functional disability^[4,5,6]. Early and accurate detection of factors affecting sleep disorder and early intervention, psychological support and proper nursing care to alleviate pain may result in improvement of quality of life in RA patients and help them lead a better life. Newer biological agents used in the treatment of RA have shown to improve sleep quality in RA in addition to dramatic improvement in signs and symptoms of RA. Whether improvement in symptoms results in better quality of sleep or as independent effect is still poorly understood. As Quality of sleep plays an important role in the quality of life of patients with RA. Therefore, evaluating sleep quality is also important in determining the effectiveness of RA treatment^[7].

Patients with RA experience different disorders related to sleep such as difficulty initiating and maintaining sleep, sleep fragmentation, insomnia, and daytime sleepiness^[8]. Few studies of sleep disturbance in RA have been conducted amongst the Indian population and very few studies are available to evaluate the effect of disease activity of RA on Sleep. Therefore, to study the relationship of disease activity with quality of sleep would be worthwhile.

MATERIALS AND METHODS

Fifty adult patients of RA as per 1987, ACR criteria^[9] attending the Rheumatology Clinic of PGIMS Rohtak, India between April 2015 to September 2015 with mild to moderate disease activity as per Clinical Disease Activity Index (CDAI) were recruited in this cross sectional

study. However, patients with severe RA or RA associated with co-morbid conditions like Diabetes, heart disease, Hypertension, Kidney Disease, Tuberculosis, Thyroid disorders, Anemia, Neuropsychiatric disorders etc. and patients on sedative drugs affecting sleep were excluded from the study. Informed consent was taken from all the participating subjects and detailed Clinical and rheumatological examination was done for each patient. The study population was divided into 2 groups on the basis of disease activity as Group 1 with CDAI score >2.8 and ≤ 10 and Group 2 with CDAI >10 and ≤ 22 . Study was duly approved by ethical committee of the University as a research project.

Pittsburg Sleep Quality Index (PSQI) Questionnaire was used to assess the sleep quality. The PSQI Questionnaire was developed by investigators in the Center for Research in Chronic Disorders at the University of Pittsburgh's School of Nursing. A vernacular version of the Questionnaire which had been standardized for the local population, by the Psychology Department, MDU Rohtak, was used in the study. The Pittsburgh Sleep Quality Index (PSQI) measures self-reported sleep quality and disturbances over the last 1 month time period.^[10] The scale has 19 items and measures 7 components of sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. A global PSQI score is obtained by summing the 7 component scores (range = 0-21). The PSQI global score accurately distinguishes "good sleepers" (PSQI total score ≤ 5) from "poor sleepers" (PSQI > 5).

Clinical Disease activity Index (CDAI) was used to assess the disease activity and select the study population (people with mild to moderate disease activity).

CDAI= swollen joints (28) +tender joints (28)+ patient Global disease activity +evaluator's global disease activity.

- **SJC:** Swollen 28-joint Count(shoulders, elbows, wrists, MCP, PIP including thumb IP, knees)
- **TJC:** Tender 28-joint Count(shoulders, elbows, wrists, MCP, PIP including thumb IP, knees)
- **PGA:** Patient Global disease Activity (patient's self-assessment of overall RA disease activity on a scale of 1-10 where 10 is maximal activity)
- **EGA:** Evaluator's Global Disease activity (evaluator's assessment of overall RA disease activity on a scale of 1-10 where 10 is maximal disease activity)

Low disease activity: CDAI>2.8 and ≤ 10 ;

Moderate Disease activity: CDAI>10 and ≤ 22 ;

High Disease activity: CDAI>22

Statistical Analysis: Pearson and Spearman's correlation techniques were used for statistical analysis using PASW statistics data editor. P value of <0.05 was taken as significant.

RESULTS

The study population consisted of 50 patients. There were 6 male and 44 female patients. Mean age of study population was 44.34 ± 11.61 years and Mean duration of disease of disease was 4.79 ± 4.92 years Disease activity was assessed using CDAI. The mean CDAI was 16.02 ± 5.626 . Mean CDAI for mild disease activity was 7.1 ± 1.79 and for moderate disease activity was 18.35 ± 3.46 .

Mean Global Score of PSQI was 8.9 ± 4.156 , for males it was 8.0 ± 2.83 and females it was 9.02 ± 4.32 . Of the total fifty patients evaluated, 37

patients (74%) were found to be poor sleepers (PSQI>5). Mean Global Score for patients with low CDAI was 6.40 ± 2.83 (poor sleepers) and for those with medium CDAI was 9.53 ± 4.22 (poor sleepers and sleep problem more than those with mild disease activity). Day time dysfunctions were more in more common in patients with medium CDAI as compare to those with Mild CDAI score. (Table-1)

As shown in Table-2, a statistical significant positive correlation was found between disease activity (using CDAI score) with sleep quality and day time dysfunction using PSQI score. However, the correlation between disease activity with sleep latency, sleep duration, sleep efficiency and sleep disturbance was not statistically significant.

A statistical significant positive correlation was found between duration of disease activity and day time dysfunction, implicating that increase in duration of disease increases day time dysfunction probably because of unrefreshing sleep at night. The global score, sleep latency, sleep duration, sleep efficiency and sleep disturbance was more with duration of disease using CDAI score. But the correlation between found to be statistically insignificant.

Based on the above observations and statistical analysis, a statistical significant positive correlation was found between age and global score, sleep latency and Sleep efficiency, indicating that problem of sleep disturbance increases with age, with more patients complaining of increasing difficulty in falling asleep with increase in age.

Table 1: Mean- Parameters of Sleep

Sleep Parameter	Mean	Low CDAI(Mean) GROUP-1	Medium CDAI(Mean) Group-2
▪ Sleep quality	1.24 ± 0.85	0.70 ± 0.48	1.37 ± 0.87
▪ Sleep Latency	2.00 ± 1.05	1.60 ± 1.17	2.10 ± 1.01
▪ Sleep Duration	1.42 ± 1.24	1.20 ± 0.92	1.48 ± 1.32
▪ Sleep Efficiency	1.02 ± 1.23	1.08 ± 0.60	1.03 ± 1.27
▪ Sleep Disturbance	1.04 ± 0.28	0.90 ± 0.32	1.08 ± 0.27
▪ Day Time Dysfunction	2.22 ± 0.93	1.60 ± 0.69	2.38 ± 0.92
▪ Global Score	8.9 ± 4.156	6.40 ± 2.83	9.53 ± 4.22

Table 2: Correlation- CDAI and Sleep Parameters

	CDAI	Global Score	Sleep Quality	Sleep Latency	Sleep Duration	Sleep Efficiency	Sleep Disturbance	Day Time dysfunction
▪ Pearson Correlation	1	.304*	.322	.192	.089	.171	.250	.336*
▪ Sig.(2-tailed)		.032	.023	.181	.538	.234	.080	.017
▪ N	50	50	50	50	50	50	50	50
▪ Spearman's Correlation	1	.298*	.333*	.186	.060	.181	.247	.384*
▪ Sig.(2-tailed)		.036	.018	.197	.680	.208	.084	.006
▪ N	50	50	50	50	50	50	50	50

*correlation is significant at the 0.05 level(2-tailed)

Table 3: Correlation- Duration of Disease and Sleep Parameters

	Duration of Disease	Global Score	Sleep Quality	Sleep Latency	Sleep Duration	Sleep Efficiency	Sleep Disturbance	Day Time dysfunction
▪ Pearson Correlation	1	-.129	-.092	-.211	.053	.055	-.001	-.318*
▪ Sig.(2-tailed)		.374	.527	.141	.715	.703	.992	.25
▪ N	50	50	50	50	50	50	50	50
▪ Spearman's Correlation	1	-.138	-.137	-.145	.52	.019	-.33	-.272
▪ Sig.(2-tailed)		.339	.343	.316	.72	.898	.820	.056
▪ N	50	50	50	50	50	50	50	50

*correlation is significant at the 0.05 level(2-tailed)

Table 4: Correlation- Age and Sleep Parameters

	Age	Global Score	Sleep Quality	Sleep Latency	Sleep Duration	Sleep Efficiency	Sleep Disturbance	Day Time dysfunction
▪ Pearson Correlation	1	.334*	.177	.378*	.272	.346*	-.081	.217
▪ Sig.(2-tailed)		.018	.219	.007	.056	.014	.574	.130
▪ N	50	50	50	50	50	50	50	50
▪ Spearman's Correlation	1	.365*	.186	.381*	.261	.382*	-.088	.182
▪ Sig.(2-tailed)		.009	.196	.006	.068	.006	.543	.205
▪ N	50	50	50	50	50	50	50	50

*correlation is significant at the 0.05 level(2-tailed)

DISCUSSION

The present study sought to determine sleep disturbance associated with disease activity of RA. Of the total fifty patients evaluated, 37 patients (74%) were found to be poor sleepers (PSQI>5). A statistical significant positive correlation was found between disease activity (using CDAI score) with sleep quality and day time dysfunction using PSQI score.

The current study provides support for previous research in RA suggesting a significant relationship between sleep disturbances and RA. It was found in the present study that increase in disease activity is associated with reduction in

sleep quality and increased day time dysfunction. Similar observation was made by Westhovens et al in a study of 305 patients of RA in the Belgian population that showed poor control of RA is associated with a reduction in sleep quality and increased daytime dysfunction^[11]. Another study conducted by Covic et al in the United States of America revealed that sleep disorders affected about ten million adults with rheumatoid arthritis, probably because of joint pain and its limitations^[12]. In another study the poor quality of sleep in patients of rheumatoid arthritis was attributed to correlated symptoms, like pain, fatigue, functional disability and depression^[13].

As per evaluation by the questionnaire(PSQI) in the present study, it was found that pain and need to use the washroom were the primary self-identified reasons by the subjects for increasing sleep latency and the inability to fall asleep (within half an hour of going to bed.)

In the present study, it was found that even in subjects with mild to moderate disease activity of RA, significant sleep disturbance is prevalent. Sleep disturbances in chronically ill adults have been associated with decrements in quality of life and psychological and physical function, as well as increases morbidity and mortality, so sleep is an important consideration in addressing health and well-being in patients with RA. These patients are highly susceptible to emotional problems owing to the disease burden, functional limitation, sleep problems and adverse effects of medication. Sleep problems, unrefreshing sleep have been found to decrease pain threshold and increase pain severity ^[14,15] So early recognition and intervention can play an important role in alleviating their symptoms and help them to increase self-esteem in these patients .Also it was found that with increase in duration of disease and with increase in age, sleep quality worsened . To provide comprehensive care, treatment targeted to improve sleep quality in patients with RA along with RA targeted therapy could help improve quality of life.

There are several limitations of the present study. The sample size was relatively small and since this was a cross sectional study with no follow up, the relation between sleep and disease activity needs further evaluation. Increasing the sample size or carrying out a longitudinal study could increase the reliability and help in better understanding of results. Further, the present study only assessed sleep quality, and did not include objective measures. Using objective measures (using polysomnography) would yield a more global account of sleep in RA and enable further exploration of the relationships between different aspects of disturbed sleep, disease activity and outcomes. Consequently, it is

important to include both self-reported and objective measures of sleep disturbances to obtain a more comprehensive assessment of sleep in adults with RA.

CONCLUSION

We conclude that poor sleep quality and sleep disturbance exists in patients with mild to moderate disease activity. Sleep is important confounding factor in the assessment of disease activity of RA and periodic assessment of sleep is necessary for better management of RA. Sleep and RA, if addressed via pharmacological or behavioral interventions, may have critical impact on health and lives of patients with RA. Early recognition and addressing sleep disturbances can further increase the adherence to therapy and overall improvement of Quality of life in RA patients. Data have been scarce regarding the sleep impairment in RA and factors precipitating it, in our scenario. Furthermore, long-term studies are required to assess the factors associated with sleep dysfunction in these patients

KEY SUGGESTIONS

- **General Measures:**
 - Practicing good sleep hygiene like could help improve sleep disturbances.
 - Regular sleep patterns
 - Go to bed and arise the same time each day
 - Avoid naps, except for brief (30 minutes) periods 8 hours after rising
 - Take a hot bath 1.5–2 hours before bedtime
 - Avoid bright light if you have to arise during the sleep period
- **Environmental factors**
 - Avoid large meals 2–3 hours before bedtime
 - Establish a bedtime ritual
 - Keep clock face turned away
 - Keep sleeping environment dark, quiet, and comfortable
 - Regularly exercise each day

- Avoid vigorous exercise 2 hours prior to bedtime
- **Drug effects**
- Give up smoking entirely or avoid smoking several hours before bedtime
- Do not smoke if you have a mid-sleep awakening
- Limit use of alcoholic beverages because they fragment sleep
- Discontinue caffeine use—caffeinated coffee, tea, soft drinks
- Avoid use of over-the-counter sleep medications
- **Aging**
- Educate patients regarding changes in sleep parameters that occur with age to reduce unrealistic expectations and anxiety.

Specific Measures:

Disease activity in patients of RA needs to be assessed periodically for improving quality of sleep and for better disease management.

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