**Background/Purpose:** Over 60% of rheumatoid arthritis (RA) patients report sleep problems. Previous studies suggest that chronotype (the preferred time of day when individuals are active, awake and alert), sleep problems, pain and emotional well-being are intimately linked. In the normal population, evening chronotype (preference for activity in the evenings) is associated with poor sleep, pain, and depression. This study examines the association between chronotypes and measures of sleep, pain and emotional well-being among RA patients with sleep problems.

**Methods:** Cross-sectional data were analyzed from 191 RA patients who participated in a substudy on sleep and morning/evening preference, within a larger longitudinal observational study. Inclusion criteria included RA patients with sleep problems (Medical Outcomes Study (MOS) Sleep Problems Index II score > 35). Between March and June 2012, participants were mailed the Horne-Ostberg Morningness-Eveningness Questionnaire (MEQ) to determine their chronotype. The Multidimensional Health Assessment Questionnaire (MDHAQ), the 5-item Mental Health Index (MHI-5) and the MOS Sleep Scale were completed during the subjects’ most recent annual study visits. Unadjusted and adjusted linear regression analyses were performed to determine the association between chronotype and sleep problems, pain and emotional well-being. Scores for morning and intermediate chronotypes were compared to scores for evening chronotypes. Multivariable linear regression models were adjusted for age, sex, serology, and disease activity (DAS28-CRP).

**Results:** 43 (22.5%) individuals exhibited a morning preference. 67 (35.1%) exhibited an evening preference, and 81 (42.4%) were intermediate chronotypes. Evening chronotypes reported significantly longer sleep duration (6.8 hours vs. 6.1 hours, p = 0.01) than intermediate chronotypes (Table). Although not statistically significant, evening chronotypes reported the lowest scores for sleep adequacy (34.5 vs. 37.1 for intermediate chronotypes and 41.9 for morning chronotypes) and the highest scores for somnolence (34.4 vs. 31.8 for intermediate chronotypes and 28.9 for morning chronotypes). Evening chronotypes also had the lowest mean scores on the MHI-5 (69.3 vs. 71.6 for intermediate chronotypes and 77.3 for morning chronotypes). Both morning and evening chronotypes had similar scores on the MOS Sleep Disturbance Scale (45.0 versus 45.8), MDHAQ Fatigue Scale (53.6 versus 53.0) and the MDHAQ Pain Scale (40.6 versus 37.5 versus).

**Conclusion:** In contrast to the general population, RA patients with an evening preference did not report lower ratings of emotional health or higher ratings of pain and fatigue, compared to intermediate or morning chronotypes. RA patients with evening chronotypes did report sleeping more hours than RA patients with morning or intermediate chronotypes, despite similar sleep adequacy scores. Additional studies are needed to determine whether morning/evening preference can be used to identify subgroups of RA patients at increased risk for sleep problems.

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| Table. Adjusted mean values for sleep, fatigue, pain and emotional well-being among RA patients with clinically significant sleep problems. |
| **Clinical Characteristic** | **Morning\*****(N = 43)** | **Intermediate\*****(N = 81)** | **Evening****(N = 67)** |
| Sleep Quantity (hours) | 6.4(p=0.26) | 6.1(p=0.01) | 6.8 |
| Sleep Adequacy(0-100 scale, higher = better sleep adequacy) | 41.9(p=0.11) | 37.1(p=0.49) | 34.5 |
| Somnolence Scale(0-100 scale, higher = more somnolence) | 28.9(p=0.25) | 31.8(p=0.51) | 34.4 |
| Sleep Disturbance Scale(0-100 scale, higher = more disturbance) | 45.0(p=0.86) | 48.5(p=0.52) | 45.8 |
| MDHAQ Fatigue Scale(0-100 scale, higher = more fatigue) | 53.6(p=0.93) | 52.2(p=0.87) | 53.0 |
| MDHAQ Pain Scale(0-100 scale, higher = more pain) | 40.6(p=0.60) | 39.7(p=0.65) | 37.5 |
| Mental Health Index 5(0-100 scale, higher = better emotional well-being) | 77.3(p=0.07) | 71.6(p=0.51) | 69.3 |
| \*P values are for comparison between morning chronotypes and evening chronotypes and the comparison between intermediate chronotypes and evening chronotypes. |