Abstract Number: 1324

Similar Negative Effects of Fatigue on Physical Activity in Persons with Rheumatoid Arthritis and Healthy Controls: A Patient-Control Study

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SESSION INFORMATION

Session Date: Monday, October 27, 2025
Session Title: (1306–1346) Rheumatoid Arthritis – Diagnosis, Manifestations, and Outcomes Poster II
Session Type: Poster Session B
Session Time: 10:30AM–12:30PM

Background/Purpose: People with rheumatoid arthritis (pwRA) are prone to fall short of the World Health Organization's physical activity (PA) recommendations due to perceived fatigue and pain. Given the high prevalence of fatigue and its impact on health-related quality of life and social participation, this study investigated objectively measured PA patterns and the association between PA and self-reported fatigue in pwRA compared to healthy controls (HC).

Methods: In this observational cross-sectional study, pwRA (DAS28 > 2.6) and HC wore a tri-axial accelerometer (ActiGraph wGT3X-BT, ActiGraph LLC) on one ankle for ≥4 days. Accelerometer-based outcomes included vector magnitude counts/min (square root of summed sagittal, frontal, and vertical axes' counts/min squared – primary outcome), step count, and time spent in moderate-to-vigorous intensity PA. Data were separated by day and time (weekday/weekend; daytime/evening) to investigate PA patterns. Fatigue severity was assessed using the Fatigue Severity Scale (FSS, 0–7). Associations between fatigue, RA status, and PA were examined using multilevel generalized estimating equations models (patient and day-timing as levels). Interactions between RA and fatigue were tested. Manual forward selection identified multivariable associations adjusted for confounders.

Results: Participants included 23 pwRA (20 females, age 52 (SD 13), FSS 4.7 (1.4)) and 18 HC (14 females, age 52 (11), FSS 2.1 (1.0)). Vector magnitude counts/min were lower in pwRA than HC at any time, with non-significant differences on weekday daytime (1534.3 (691.3) in pwRA vs 1802.6 (610.6) in HC), and larger differences on weekday evenings (880.7 (491.4) vs 1457.3 (572.7)) (Figure 1). Step count was also lower in pwRA (587 (226) vs 724 (224) steps/h), as was time spent in moderate-to-vigorous PA (1.6 (1.4) vs 2.7 (1.5) min/h). No interaction was found between fatigue and RA, indicating that
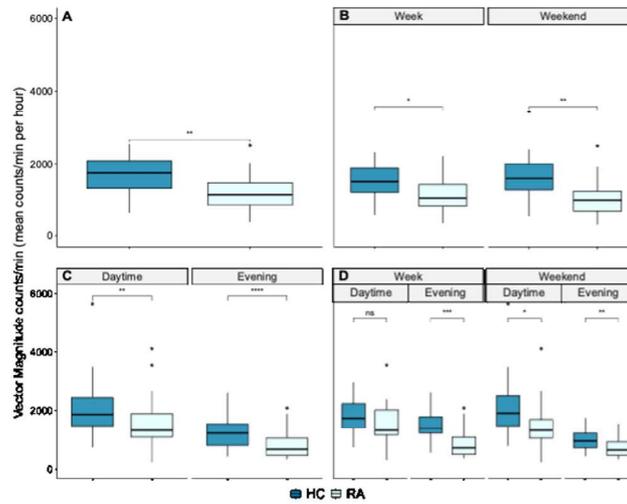
Figure 1: Vector Magnitude counts per minute (mean counts/min per hour) measured in rheumatoid arthritis patients (RA) and healthy controls (HC) overall (A), on weekdays as compared to the weekend (B), during the day and during the evening (C), and separated by day as well as timing of the day (D). ns p > .05, * p < .05, ** p < .01, *** p < .001, **** p < .0001

Table 1: Effect of RA vs HC on the Vector Magnitude Counts per Minute in univariable and multivariable Generalized Estimating Equations analyses

Variables	Univariable model Coefficient (95% CI)	Multivariable model Coefficient (95% CI)
Age (years)	2.48 (-9.53; 14.50)	na
Male vs Female	136.46 (-315.00; 587.91)	na
BMI (kg/m²)	-47.14 (-78.60; -15.67)	-27.18 (-50.73; -3.62)
FFM (kg)	-6.20 (-24.68; 12.28)	na
RA vs HC	-467.72 (-768.40; -167.05)	-330.63 (-650.45; -10.81)
FSS (0-7)	-117.06 (-216.04; -18.09)	-43.89 (-135.26; 47.48)
Weekend vs Week	-24.48 (-301.03; 252.07)	§
Evening vs Daytime	-724.93 (-945.42; -504.44)	§
Day-Timing:		
Weekend-Daytime	Reference	Reference
Weekday-Daytime	-123.89 (-509.31; 261.54)	-129.66 (-527.19; 267.87)
Weekday-Evening	-687.07 (-1059.60; -314.54)	-723.68 (-1091.19; -356.16)
Weekend-Evening	-942.19 (-1287.31; -597.07)	-970.77 (-1322.72; -618.82)

§Variables Weekend vs Week and Evening vs Daytime were not considered for the multivariable model, since the variable Day-Timing combines the information from both these variables

na: variable not significant in the univariable model and not a confounder for RA vs HC and therefore not included in the multivariable model

BMI, Body Mass Index; FFM, Fat Free Mass; FSS, Fatigue Severity Scale

fatigue affected PA similarly in both groups. Likewise, no interaction between group and day-timing was observed, suggesting comparable daily PA patterns in pwRA and HC. RA was significantly and negatively associated with vector magnitude counts/min after adjusting for confounders (β = -330.63; 95% CI = -650.45 to -10.81; Table 1). In the multivariable model, lower vector magnitude counts/min was seen in pwRA, persons with higher fatigue severity (β = -43.89; 95% CI = -135.26 to 47.48), and in persons with higher BMI (β = -27.18; 95% CI = -50.73 to -3.62). BMI, RA presence, and fatigue were similarly negatively associated with step count and time spent in moderate-to-vigorous PA.

Conclusion: pwRA performed less objectively measured PA than HC. Fatigue was inversely associated with PA, with no differential impact between groups. Future research should examine the role of transient vs persistent fatigue, employability, inflammation, and medication use in PA participation. This may identify which patients are most at risk of falling short of PA guidelines and help design effective interventions.

Disclosure: M. Cox: None; **K. Theunissen**: None; **K. Meijer**: None; **A. Timmermans**: None; **S. Ramiro**: AbbVie, 2, 5, Eli Lilly, 2, 5, Galapagos/Alfasigma, 2, 5, Janssen, 2, MSD, 2, 5, Novartis, 2, 5, Pfizer, 2, 5, Sanofi, 2, 5, UCB, 2, 5; **A. Boonen**: AbbVie/Abbott, 5, Alfasigma, 2, Celgene, 5, Eli Lilly, 2, Novartis, 2, Sandoz, 2, UCB, 2; **G. Plasqui**: None.

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