

Background

- Too much sitting, too enough light or higher intensity activity and too little or too much sleep are all associated with higher risk of all-cause mortality.¹⁻³
- Interventions promoting changes in daily activity in adults living with arthritis tend to focus on supporting behavior change without consideration of an individual's overall 24-hour activity profile.

Purpose

To identify:

1. 24-hour activity profiles in people living with arthritis.
2. Factors associated with 24-hour activity profile allocation.

Methods

Design: Secondary analysis baseline data from two randomized clinical trials studying effect of physical activity counselling for people with knee osteoarthritis (OA), rheumatoid arthritis (RA), or systemic lupus erythematosus (SLE).^{4,5}

Self-reported Outcomes: Online surveys for age, sex, arthritis type, usual occupation, depression (PHQ-9 Depression scale), habitual sitting / walking behaviors (Self-reported Habit Index: SRHI).

Physical Activity: 24-hour activity measured by Sensewear Mini™ (Figure 1). Data included if 4 to 6 days with 20+ hours of wear. Data stratified by minutes off body, sleeping, resting, sitting, walking intermittently (< 50 steps / min) or walking purposefully (> 50 steps / min)



Figure 1: Sensewear Mini™ worn on upper arm

Statistical Analyses:

1. Latent Class Analysis (LCA) with Akaike's and Bayesian Information Criterion (A/BIC) model fit analyses to define cluster number (SAS_{9.4} software).
2. Multiple logistic regression, backward elimination, to identify factors predictive of cluster allocation relative to cluster with highest sitting (Odds Ratio, 95% CI) (SAS_{9.4} software).

Results

Demographics: 172 individuals; mean age 58.1 years; 86% female; OA (30%), RA (49%), SLE (21%), mean daily steps 5990 (SD: 3234).

Results (Con't)

Cluster Allocation: (Figures 2, 3 & Table 1)

Relative to all participants [on average 11.3 hours sitting, 3.5 hours walking, 7.2 hours sleeping] we defined four distinct 24-hour activity profiles:

- **Balanced Activity** (n=40) [on average 9.4 hr sitting, 5.2 hr walking, 7.4 hr sleep]
- **High Sleeping** (n=45) [on average 10.4 hr sitting, 2.8 hr walking, 8.4 hr sleep]
- **Low Sleeping** (n=52) [on average 12.2 hr sitting, 3.9 hr walking, 6.5 hr sleep]
- **High Sitting** (n=35) [on average 13.2 hr sitting, 1.9 hr walking, 6.9 hr sleep]

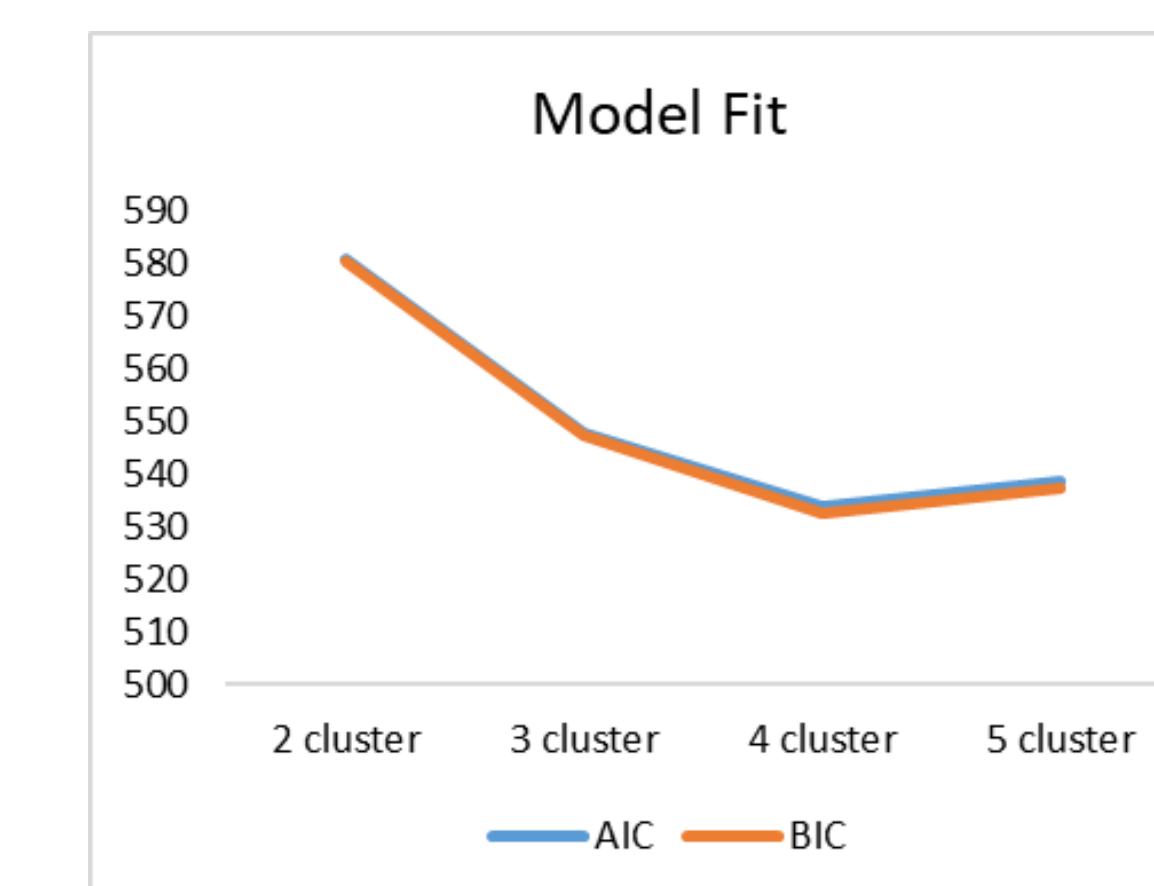
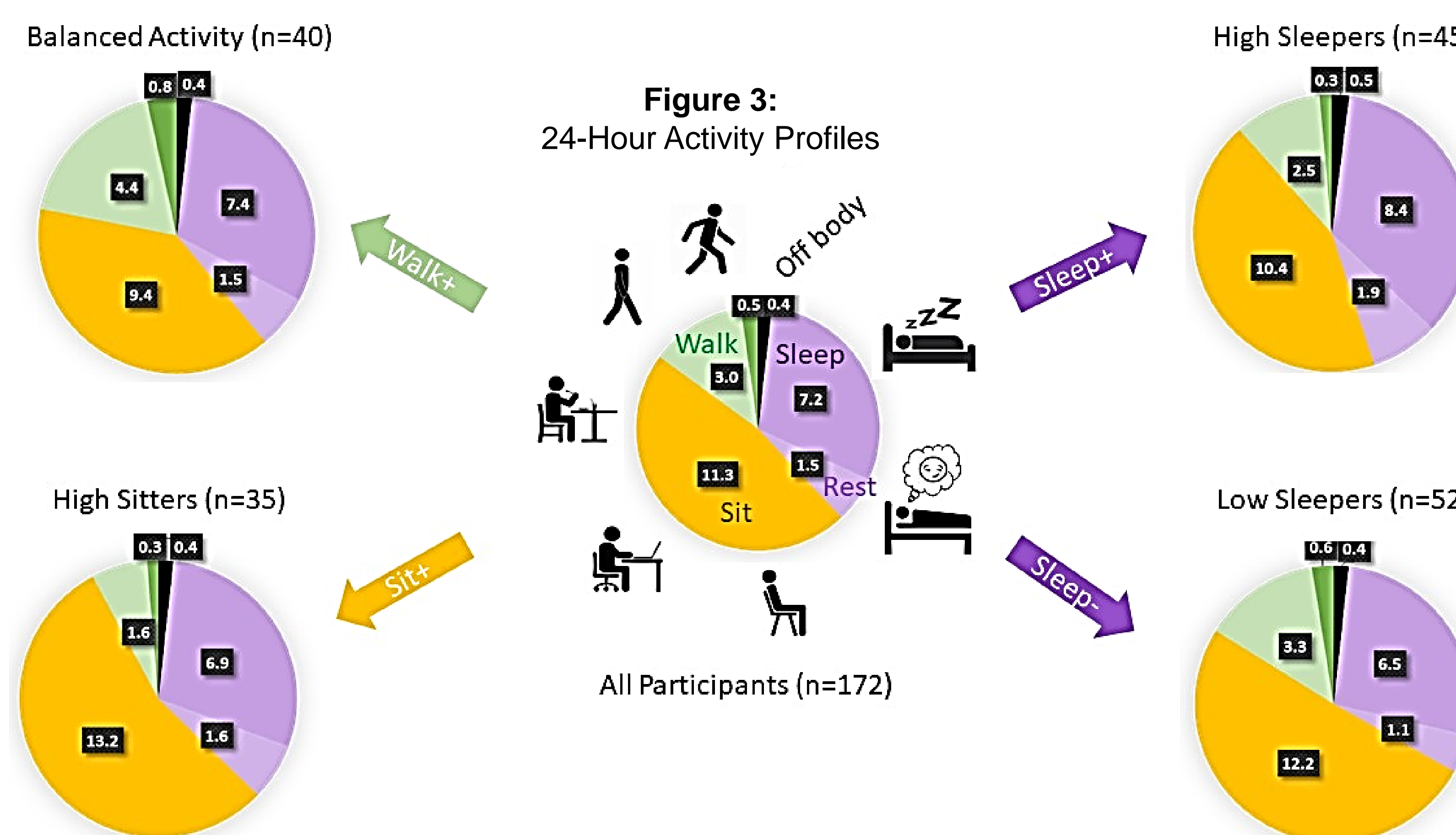


Figure 2: A/BIC Model Fit

Cluster Prediction: Age and habit strength for occupational sitting and walking outside predicted cluster allocation. Relative to individuals in the high sitting cluster, individuals in the other clusters were younger (OR: 0.95 to 0.98), had weaker occupational sitting habits (OR: 0.56 to 0.74) and stronger walking outside habits (OR: 1.09 to 1.43) (Table 2).



	* Balanced Activity	High Sleeping	Low Sleeping	High Sitting
Age (Years)	54.9 (12.7)	55.2 (14.2)	60.5 (11.6)	61.8 (15.0)
Sex_Male (%)	12.5	13.3	7.7	22.9
Steps / day [mean (SD)]	9378.5 (3085.9)	4229.1 (1422.7)	6706.0 (2618.1)	3317.3 (1738.9)
Self-Reported Habit Index (SRHI: Score 1-7, Weak to Strong)				
Sitting Habit – Home Leisure	4.3 (1.5)	4.8 (1.3)	4.7 (1.3)	5.3 (1.0)
Sitting Habit – Usual Occupation	3.8 (1.8)	4.7 (1.8)	4.6 (1.6)	5.3 (1.4)
Walking Habit – Outside 10+ minutes	4.5 (1.9)	3.7 (1.8)	4.4 (1.6)	3.6 (1.6)

* Balanced activity: < 9.5 hours sitting, > 6.25 hours light, ½ hour Moderate to Vigorous Activity (MVPA), and > 6 & < 9 hours sleep (refs: 1-3)

	Balanced Activity	High Sleeping	Low Sleeping	High Sitting
Multivariable Logistic Regression: Backward Selection (Reference Cluster = High Sitting)				
Age	0.95 (0.91-0.99)	0.96 (0.92-0.99)	0.98 (0.95-1.02)	1
Occupational Sitting Habit	0.55 (0.41-0.76)	0.74 (0.55-1.01)	0.74 (0.55-1.00)	1
Walking Outside Habit	1.43 (1.06-1.91)	1.09 (0.83-1.43)	1.37 (1.04-1.79)	1

Factors eliminated from model: Sex, Type of Arthritis, Depression, and Home Leisure Sitting Habit

Conclusion

Tailoring activity interventions for individuals living with arthritis based on 24-hour activity profiles may be indicated; particularly in older adults with stronger habitual sitting or weaker habitual walking behaviors