

COMPARISON BETWEEN CONTINUOUS AND INTERMITTENT ACTIGRAPHY OUTCOMES DURING LONG-DURATION MISSIONS

E. E. Flynn-Evans¹, Z. Glaros¹, R. A. Jansen²

¹Fatigue Countermeasures Lab, NASA Ames Research Center, ²Fatigue Countermeasures Lab, San Jose State University Research Foundation

INTRODUCTION

Historically, astronauts have worn actigraphy watches continuously throughout their missions. This has enabled reliable sleep estimation and comparisons between sleep and other outcomes and mission activities such as the arrival of a visiting vehicle. However in late 2020, astronauts were scheduled to wear an actiwatch for one 2-week period every two months, substantially decreasing availability of data. Our aim was to compare sleep and mission events between data collected continuously and data collected intermittently to identify any differences.

METHODS

Crewmembers ($n = 19$) who volunteered for the NASA Standard Measures protocol between January 2019 and March 2022 were provided with actiwatches (Phillips, Respironics, Bend OR) that they wore either continuously (C; $n = 9$) or for two weeks every two months while in space (2W; $n = 10$). We used crew schedules to identify mission events that were asynchronous with actigraphy. We further compared sleep outcomes (sleep duration, wake after sleep onset [WASO], sleep efficiency) between the C and 2W actigraphy collection.

RESULTS

In the 2W group, sleep data was not available for 52% of EVAs, 67% of visiting vehicle events, and 67% of commander turnovers. Average sleep duration for the 2W group ($M = 6.91, \pm 1.24$ SD) was significantly lower compared to the C group ($7.51 \pm 1.08, p < .01$). Sleep efficiency was better for those in the C group (90.56 ± 5.19) than for those in the 2W group ($87.02 \pm 6.47, p < .01$). There were no significant differences in WASO (C = 26.66 ± 12.99 ; 2W = 32.38 ± 18.83).

DISCUSSION

Continuous actigraphy data collection yields different sleep outcomes compared to intermittent data collection. In addition, many mission events were not captured with intermittent data collection. Our findings support the use of continuous actigraphy data collection.