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Timed Light Therapy for Sleep and Daytime Sleepiness Associated With Parkinson DiseaseA Randomized Clinical Trial

Aleksandar Videnovic, MD, MSc[1,2]; Elizabeth B. Klerman, MD, PhD[2,3]; Wei Wang, PhD[2]; et al
Angelica Marconi, MS[4]; Teresa Kuhta, DO[4]; Phyllis C. Zee, MD, PhD[4]
Author Affiliations
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Findings In this randomized clinical trial of 31 participants with PD and coexistent excessive daytime sleepiness, light therapy administered twice daily for 2 weeks was well tolerated and resulted in significant improvements of excessive daytime sleepiness and several other metrics of sleep and PD severity.

Importance Impaired sleep and alertness are some of the most common nonmotor manifestations of Parkinson disease (PD) and currently have only limited treatment options. Light therapy (LT), a widely available treatment modality in sleep medicine, has not been systematically studied in the PD population.

Objective To determine the safety and efficacy of LT on excessive daytime sleepiness (EDS) associated with PD.

Design, Settings, and Participants This randomized, placebo-controlled, clinical intervention study was set in PD centers at Northwestern University and Rush University. Participants were 31 patients with PD receiving stable dopaminergic therapy with coexistent EDS, as assessed by an Epworth Sleepiness Scale score of 12 or greater, and without cognitive impairment or primary sleep disorder. Participants were randomized 1:1 to receive bright LT or dim-red LT (controlled condition) twice daily in 1-hour intervals for 14 days. This trial was conducted between March 1, 2007, and October 31, 2012. Data analysis of the intention-to-treat population was conducted from November 1, 2012, through April 30, 2016.

Main Outcomes and Measures The primary outcome measure was the change in the Epworth Sleepiness Scale score comparing the bright LT with the dim-red LT. Secondary outcome measures included the Pittsburgh Sleep Quality Index score, the Parkinson's Disease Sleep Scale score, the visual analog scale score for daytime sleepiness, and sleep log–derived and actigraphy-derived metrics.

Results Among the 31 patients (13 males and 18 females; mean [SD] disease duration, 5.9 [3.6] years), bright LT resulted in significant improvements in EDS, as assessed by the Epworth Sleepiness Scale score (mean [SD], 15.81 [3.10] at baseline vs 11.19 [3.31] after the intervention). Both bright LT and dim-red LT were associated with improvements in sleep quality as captured by mean (SD) scores on the Pittsburg Sleep Quality Index (7.88 [4.11] at baseline vs 6.25 [4.27] after bright LT, and 8.87 [2.83] at baseline vs 7.33 [3.52] after dim-red LT) and the Parkinson's Disease Sleep Scale (97.24 [22.49] at baseline vs 106.98 [19.37] after bright LT, and 95.11 [19.86] at baseline vs 99.28 [16.94] after dim-red LT). Bright LT improved several self-reported mean (SD) sleep metrics, including sleep fragmentation (number of overnight awakenings, 1.51 [1.03] at baseline vs 0.92 [0.97] after the intervention), sleep quality (sleep diary score, 3.03 [1.01] at baseline vs 3.53 [0.91] after the intervention), and ease of falling asleep (sleep diary score, 2.32 [0.89] at baseline vs 1.83 [0.88] after the intervention). Light therapy was associated with increased daily physical activity as assessed by actigraphy (average activity [SD] counts, 165.01 [66.87] at baseline vs 194.59 [87.81] after the intervention).

Conclusions and Relevance Light therapy was well tolerated and may be a feasible intervention for improving the sleep-wake cycles in patients with PD. Further studies are required to determine optimal parameters of LT for PD.