A Lighting Intervention for Patients with Alzheimer's Disease in Long-Term Care Facilities

Older adults with Alzheimer's disease and related dementias (ADRD) experience severe dysfunctions of their sleep−wake and rest−activity patterns, and are at high risk for depression and agitation behavior. We investigated the effectiveness of a tailored lighting intervention (TLI) designed to maximally affect the circadian system as a non-pharmacological therapy for treating problems with sleep, mood, and behavior in persons with ADRD.
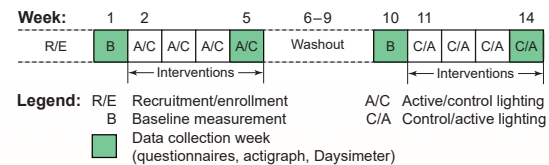

Figure 1. The 14-week protocol was composed of two 1-week baseline measurement periods and two 4-week counterbalanced lighting interventions (active versus control). Data were collected during the baseline measurement weeks (weeks 1 and 10) prior to each 4-week intervention and once again during the final week of each intervention (weeks 5 and 14).

Methods

Using a variety of light sources (i.e., floor luminaires, light boxes, and light tables), this 14-week randomized, placebo-controlled, crossover design clinical trial administered an all-day (≈06:00–08:00 to 18:00) active (a high circadian stimulus [CS] of 0.4) or control (low CS of < 0.1) TLI to 46 patients with ADRD in 8 long-term care facilities for two 4-week periods (separated by a 4-week washout [Figure 1]). The study employed wrist-worn actigraphy and standardized measures of sleep quality, mood, and behavior.
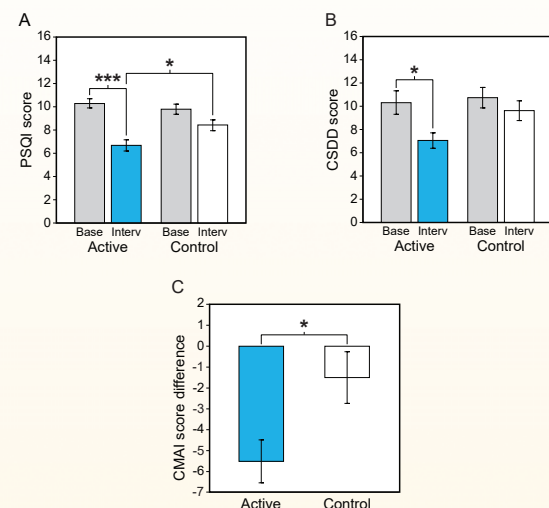

Figure 2. Mean raw scores for measures of sleep disturbances (A) and depression (B), and mean difference scores agitation behavior (C) for the active and control interventions. The error bars represent standard error of the mean. Note: *** represents P < .001 and * represents P < .05. PSQI = Pittsburgh Sleep Quality Index, CSDD = Cornell Scale for Depression in Dementia, CMAI = Cohen-Mansfield Agitation Inventory.

Results

- The active TLI significantly improved Pittsburgh Sleep Quality Index scores compared to baseline (Figure 2A).

- The active TLI resulted in significantly greater active versus control differences in intra-daily variability.

- The active TLI resulted in significant improvements in Cornell Scale for Depression in Dementia scores (Figure 2B) and significantly greater active versus control differences in Cohen-Mansfield Agitation Inventory scores (Figure 2C).

Conclusion

A lighting intervention tailored to maximally entrain the circadian system can improve sleep, mood, and behavior in patients with ADRD. Our research shows that circadian-effective light, when carefully specified and implemented, can positively impact of those living with ADRD in assisted-living and long-term care facilities.

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