Tailored light treatment improves measures of sleep, depression and agitation in persons with dementia living in long-term care facilities

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Introduction
Persons with Alzheimer’s disease and related dementias (ADRD) are often difficult for family caregivers to manage because of sleep problems, nocturnal wandering, and associated daytime irritability. Preliminary studies using light therapy have shown that appropriately-timed light exposure can consolidate and improve nighttime sleep efficiency, increase daytime wakefulness, and reduce evening agitation (Van Someren et al. 1997; Mishima et al. 1998; Ancoli-Israel et al. 2003). Since the human circadian system is maximally sensitive to short-wavelength (blue) light, lower, more targeted light interventions for therapeutic purposes can be used. The present study was designed to test the effectiveness of a tailored light treatment on measures of sleep quality, agitation and depression in those with ADRD living in nursing homes.

Exposure to the tailored light treatment significantly (p<0.05) increased global sleep scores from the Pittsburgh Sleep Quality Index (PSQI), decreased depression scores from the Cornell Scale for Depression in Dementia (CSDD) and decreased agitation scores from the Cohen-Mansfield Agitation Inventory (CMAI). Light exposure also significantly (p<0.05) increased phaser magnitude, a measure of the 24-h resonance between light-dark and activity-rest patterns, consistent with an increase in circadian entrainment. Total sleep time and sleep efficiency (ratio of total time asleep and total time in bed) were also significantly greater (p<0.05) after the light intervention than after baseline.

Results

Exposure to the tailored light treatment significantly (p<0.05) increased global sleep scores from the Pittsburgh Sleep Quality Index (PSQI), decreased depression scores from the Cornell Scale for Depression in Dementia (CSDD) and decreased agitation scores from the Cohen-Mansfield Agitation Inventory (CMAI). Light exposure also significantly (p<0.05) increased phaser magnitude, a measure of the 24-h resonance between light-dark and activity-rest patterns, consistent with an increase in circadian entrainment. Total sleep time and sleep efficiency (ratio of total time asleep and total time in bed) were also significantly greater (p<0.05) after the light intervention than after baseline.

Conclusion
A light treatment tailored to increase circadian stimulation during the day can be used to increase quality of life in those with ADRD. The benefits of using a more targeted light source is that lower light levels can be used to achieve the same circadian stimulation. A larger study should be conducted to confirm the present results. Given that practical and effective systems such as the ones used in the present study can be designed and installed, light treatments could be beneficial to those with ADRD and their caregivers.

References

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