



KEY POINT SUMMARY

OBJECTIVES

The purpose of this study is to examine the feasibility and efficacy of a lighting intervention designed to support high circadian stimulation through moderate light levels using a high-CCT white light source.

DESIGN IMPLICATIONS

Low-level “bluish-white” lighting can be incorporated into spaces that are frequently used by patients with ADRD or similar conditions in a way that is non-invasive and visually appealing. The lights could be both automatically timed according to the time of day and manually adjustable.

Tailored lighting intervention improves measures of sleep, depression, and agitation in persons with Alzheimer’s disease and related dementia living in long-term care facilities

Figueiro, M. G., Plitnick, B. A., Lok, A., Jones, G. E., Higgins, P., Hornick, T. R., & Rea, M. S. 2014 | *Clinical Interventions in Aging*. Volume 9, Pages 1527-1537

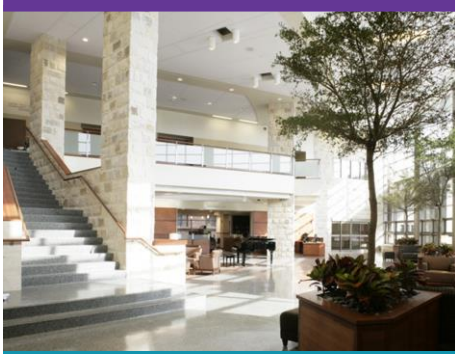
Key Concepts/Context

In 2010, an estimated 5.1 million elderly Americans were affected by Alzheimer’s disease and related dementia (ADRD). Individuals with ADRD are often transferred into controlled environments due to common behavioral symptoms such as nocturnal wandering, disturbed sleep-wake patterns, agitation, and verbal or physical abuse. Studies have shown that light therapy has the potential to be an effective nonpharmacological treatment for ADRD symptoms such as cognitive decline, sleep irregularities, and agitation. While studies have indicated that short wavelength light, or “blue-enriched” light sources, can help treat sleep disorders, differences between lights of different color correlated temperatures (CCTs) have not been thoroughly investigated. No previous studies have presented empirical evidence suggesting that white light sources with shorter wavelength content delivered at lower brightness levels can help treat circadian sleep disorders in ADRD patients.

Methods

14 participants (nine female, five male, mean age of 86.9) were recruited from different long-term care facilities in America. The subjects’ mental states were assessed with the Brief Interview for Mental Status, resulting in a mean score of 7.7 (0-7 suggests severe impairment, 8-12 suggests moderate impairment). All participants were diagnosed with mild to moderate dementia based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV).

Baseline light measurements were taken with an illuminance meter (Gigahertz-Optik X91 Photometer; Gigahertz-Optik GmbH, Turkenfeld, Germany) placed at eye level where residents are normally seated. Other baseline data were collected



The Center for Health Design: Moving Healthcare Forward

The Center for Health Design advances best practices and empowers healthcare leaders with quality research that demonstrates the value of design to improve health outcomes, patient experience of care, and provider/staff satisfaction and performance.

Learn more at
www.healthdesign.org

using questionnaires and a Daysimeter, which estimated total sleep time, sleep efficiency (% of actual sleep between lights-out and awakening), and sleep-onset latency (time between lights-out and sleep).

The lighting interventions, or luminaires, were installed in the patients' rooms depending on room sizes and where the patients spent most of their time during the day. These lights were timed to turn on when the participant awoke and off at 6 p.m. daily.

After four weeks, luminaires were removed from the room. Data were collected from questionnaires and Daysimeters immediately after luminaire removal and four more weeks after the intervention.

Findings

300-400 lux of bluish-white light significantly benefitted sleep efficiency and global PSQI scores, while also decreasing depression (according to CSDD scores) and agitation (according to CMAI scores). The lighting interventions also had a positive influence on circadian entertainment. When spectrum and light levels were combined, it was found that the intervention lighting could potentially generate a 20-fold greater circadian stimulation than the baseline lighting. Overall, the lighting intervention improved behavior and increased sleep quality in patients with ADRD.

Limitations

The study focused on patients who typically stayed in one room, which may have factored into the effectiveness of the intervention. A small sample size of 14 participants was evaluated over a short period of time of about two months.

The Knowledge Repository is provided with the funding support of:



Additional key point summaries provided by:



RESEARCH DESIGN
CONNECTIONS