SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The purpose of the study is to determine whether fragmented sleep in nursing home patients would improve with increased exposure to bright light.

DESIGN IMPLICATIONS

The study suggests the positive impact of morning bright light on delaying the peak of the activity rhythm (acrophase) and making the circadian rhythm more robust. Therefore, various design approaches regarding building orientations, window locations, or sizes should be considered to increase morning (both natural and artificial) bright light exposure of patients.

Effect of Light Treatment on Sleep and Circadian Rhythms in Demented Nursing Home Patients

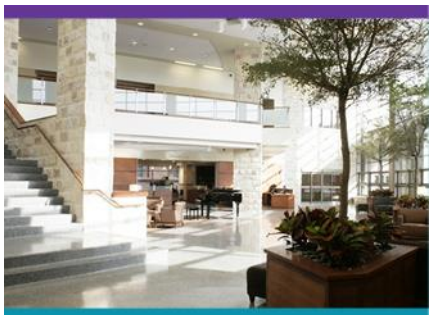
Ancoli-Israel, S., Martin, J. L., Kripke, D. F., Marler, M., Klauber, M. R.
2002 | Journal of the American Geriatrics Society
Volume 50, Issue 2, Pages 282-289

Key Concepts/Context

The disturbed sleep seen in nursing home residents may be due to changes in circadian rhythms. Human circadian rhythms are biological cycles of about 24 hours that include sleep/wake, body temperature, and melatonin secretion cycles. A second reason for sleep disturbances in this population may be decreased exposure to bright light. Bright light (≥ 2,000 lux) appears to be one of the most powerful synchronizers of circadian rhythms, directly influencing melatonin secretion, sleep/wake patterns, and other circadian rhythms .New research suggests that bright light exposures at certain times may increase the amplitude of circadian rhythms without necessarily affecting the phase of the rhythm.Several groups of investigators have studied the effect of bright light on sleep in demented people, but no clear- cut conclusions can yet be drawn.

Methods

- Data for this study were collected at two private San Diego-area nursing homes.
- Seventy-seven residents (58 women, 19 men) participated. Mean age was 85.7 ± 7.3 and mean Mini-Mental State Examination was 12.8 ± 8.8.
- Participants were assigned to one of four treatments: evening bright light, morning bright light, daytime sleep restriction, or evening dim red light.
- Patients in the evening bright light group were exposed to 2,500 lux from 5:30 p.m. to 7:30 p.m. The goals of the evening bright light were to increase total daily illumination exposure and delay the circadian rhythm, which was hypothesized to be abnormally phase advanced. Patients in the morning bright light group were exposed to 2,500 lux from 9:30 a.m. to 11:30 a.m. The goals of the morning light were to increase total daily illumination exposure



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and increase the synchronization of circadian rhythms without necessarily shifting the phase. Patients in the dim light group were exposed to less than 50 lux red light from 5:30 p.m. to 7:30 p.m. This was to serve as a control condition for the bright light groups. A staff member sat with the patients during each two-hour light treatment period to ensure that the patients remained awake and did not wander away from the light box. For patients in the daytime sleep restriction group, one staff member accompanied each patient for six hours during the day, 9:00 a.m. to noon and after lunch from 2:00 p.m. to 5:00 p.m. Staff ensured that patients did not doze off or fall asleep during this time, thereby restricting sleep during the day.

- Improvement in nighttime sleep quality, daytime alertness, and circadian activity rhythm parameters was measured using an Actillume recorder (Ambulatory Monitoring, Inc., Ardsley, NY). The Actillume also contains a log-linear photometric transducer, and the illumination measurements are approximately log-linear from a range of below full moonlight to the brightest summer day at noon. The Action3 software package (Ambulatory Monitoring, Inc.) was used to score the sleep/wake based on sum and maximum activity and to compute bright light exposure.

Findings

There were no improvements in nighttime sleep or daytime alertness in any of the treatment groups. Morning bright light delayed the peak of the activity rhythm (acrophase) and made the circadian rhythm more robust. In addition, subjects in the morning bright light group had improved activity rhythmicity during the 10 days of treatment.

Limitations

Author-identified limitations are as follows: Although the sample size in the current study was relatively large for a light therapy trial, it is rather small for standard treatment trials. Therefore, the possibility that treatment effects exist in this study should not be discounted. Additional larger trials are still needed to determine whether light administered at different times to patients with known Alzheimer's disease will have a beneficial effect on sleep.