



KEY POINT SUMMARY

OBJECTIVES

The objective of the study was to re-analyze a data set collected for a previously published study about dynamic lighting systems – in this case to evaluate weather data variations and the change in season to understand daylight availability, the long-term effect on circadian entrainment, and 24-hour motor activity in elderly nursing home residents with dementia.

Night-time activity forecast by season and weather in a longitudinal design - natural light effects on three years' rest-activity cycles in nursing home residents with dementia

Wahnschaffe, A., Nowozin, C., Rath, A., Floessner, T., Appelhoff, S., Münch, M., Kunz, D., 2017 | *International Psychogeriatrics*. Volume 29, Issue 12, Pages 2071-2080

Key Concepts/Context

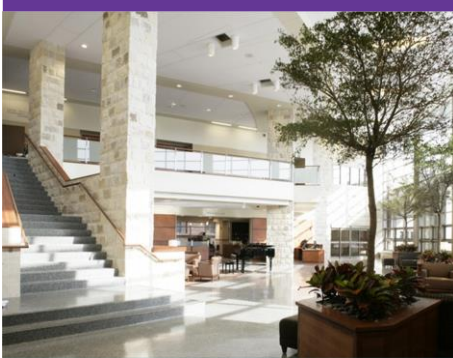
Elderly nursing home residents with dementia suffer from night-time agitation due to the lack of adequate exposure to natural light. Short winter days and overcast skies have a strong effect on circadian rhythm and motor activities. Understanding the effect of the weather and the season on these disturbances could inform the design of nursing homes.

Methods

During a three-year period wrist monitors were worn by 20 elderly nursing home residents with dementia in Berlin, Germany, to measure their motor activity. The analysis of the non-parametric circadian rhythm data was done using special software. Additionally, data regarding cloud cover and day length were collected from local German meteorological services.

Findings

The study found a strong correlation between the amount of daylight exposure and night-time activity. On cloudy short days the activity was higher than on cloudy long days and even clear short days. During the summer time and after longer periods of clearer days year-round nursing home residents with dementia experienced less agitation and restlessness at night.



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Limitations

Of the 34 residents living at the nursing home only 20 fit the selection criteria to be included in the study. 14 were excluded for various medical conditions that made them ineligible for the study. There were 19 male participants and only one female, which gave gender-unbalanced results. Mobility and eye functioning varied among the participants, and the study did not account for their social activities. In addition, the study did not record subjective night-time behaviors, which calls for replication with a larger sample taking into account these confounders.

Design Implications

Since the study concluded that natural light exposure is important during the short winter months, the authors explained that complementary electrical lights and increased levels of natural light could be used for intervention. Most studies indicate that adequate artificial light in nursing homes could induce the effect of natural light exposure in elderly residents with dementia. Improved interior design with dynamic lighting systems using different light intensities and spectral compositions over a 24-hour period will result in better lighting distribution to reduce circadian rhythm disturbances. The authors also note that most studies are done in winter months to avoid the influence of natural light; therefore, they also suggest that daylight is also a potentially effective intervention.

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