

# Non-pharmacologic treatment of insomnia in persons with dementia

Denis Shub, MD; Roham Darvishi, MD; Mark E. Kunik, MD, MPH

The prevalence of insomnia increases with age and affects up to 35% of community-dwelling adults with dementia. Sleep disturbances and associated cognitive and behavioral symptoms in this patient population can be a significant contributor to morbidity, mortality, and caregiver burden. Despite the frequency with which sleep disorders are encountered in primary care, few evidence-based guidelines are available to guide physician treatment plans. Sedative-hypnotic medications are commonly prescribed but are associated with significant adverse effects and have limited efficacy data. Non-pharmacologic treatments can be safe and effective adjuncts or alternatives to medications but are often underused in clinical practice. This article reviews practical applications of modalities such as light therapy, exercise, and sleep-hygiene modification in treating insomnia in persons with dementia.

Shub D, Darvishi R, Kunik ME. Non-pharmacologic treatment of insomnia in persons with dementia. *Geriatrics*. 2009;64(2):22-26.

**Key words:** aging, circadian rhythm, dementia, insomnia, light therapy, sleep hygiene

**Drugs discussed:** zolpidem, mirtazapine

**Dr Shub** is a resident, Menninger Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine, Houston, Texas.

**Dr Darvishi** is a staff physician, Michael E. DeBakey Veterans Affairs Medical Center, Houston, and assistant professor, Department of Medicine, Baylor College of Medicine.

**Dr Kunik** is Associate Director, Houston Center for Quality of Care & Utilization Studies; Associate Director, Research Training, VA South Central Mental Illness Research, Education & Clinical Center; Professor, Menninger Department of Psychiatry and Behavioral Sciences, Baylor College of Medicine.

**Disclosure:** The authors report no conflicts of interest. This work was supported in part by the Houston VA HSR&D Center of Excellence (HFP90-020)

Insomnia is an important problem encountered in the geriatric population. In addition to sleep changes that normally occur with aging, the neurodegenerative changes of dementia further compound the problem by increasing the frequency and severity of sleep disturbances and associated behavioral disruptions. A community-residing, population-based study of individuals with Alzheimer's disease suggests that 35% of subjects are affected,<sup>1</sup> which is likely much lower than in clinic and nursing-home populations. Sleep disturbances can be a significant contributor to caregiver burden, and they are often a reason caregivers cite for their decision to institutionalize.<sup>2</sup> Chronic insomnia in older patients is also an independent predictor of cognitive decline, falls, and increased 2-year mortality.<sup>3-5</sup>

Primary care physicians are often faced with an arduous task of addressing these sleep problems, frequently by prescribing sedative-hypnotic or other sedating psychotropic medications. Up to 36% of patients with severe sleep, cognitive, functional, and behavioral impairments take a sedative-hypnotic, anxiolytic, antipsychotic, or antidepressant medication. Although judicious use of medications may be helpful in addressing sleep and associated neuropsychiatric disturbances, their excess use may also lead to increased risk of cognitive adverse effects, falls, and even death in patients with dementia.<sup>6,7</sup> On the other hand, non-pharmacologic interventions are safe and effective adjuncts or alternatives for treatment of insomnia.

Physicians often receive information on use of pharmacologic interventions (an evidence-based review may be found within the American Psychiatric Association Practice Guideline for the Treatment of Patients with Alzheimer's Disease and Other Dementias),<sup>8</sup> but fewer resources are available on non-pharmacologic alternatives. This article will briefly review the initial presentation of insomnia in persons with dementia and focus on the practical application of non-pharmacologic treatments to dementia patients encountered in primary care practice.

## Phenomenology and assessment

Sleep disturbances in persons with dementia have var-

ied clinical presentations. Changes in sleep architecture normally occur with age and are accentuated in dementia. More time is spent in lighter stages of sleep (stages 1 and 2) with a significant decrease in slow-wave (stages 3 and 4), rapid eye movement, and total sleep time.<sup>9,10</sup> These changes in sleep structure manifest in increased sleep fragmentation and arousals, with resultant excessive daytime sleepiness and napping. Damage of neuronal pathways in the suprachiasmatic nucleus of the hypothalamus, the area believed to initiate and maintain sleep as well as changes in the circadian rhythm, may further disrupt sleep in persons with dementia and lead to shifts or complete day/night sleep-pattern reversals.<sup>9</sup> In a population-based sample of Alzheimer's disease patients, the most common sleep-related behavior problems reported by caregivers were sleeping more than usual (40%) and awakening early (31%), whereas being awakened at night (24%) was the most distressing problem for caregivers.<sup>1</sup>

## NITE-AD used light therapy, sleep hygiene, and exercise.

Clinical assessment of individuals with insomnia must always include screening for secondary causes, including medical and psychiatric conditions (eg, depression) and medication side effects, as well as specific sleep disorders. Although this article will emphasize treatment of primary insomnia, a discussion of comorbidities (eg, sleep-disordered breathing, periodic limb movements in sleep, and restless-leg syndrome) can be found elsewhere.<sup>10,11</sup> Objective baseline measure of the patient's sleep disturbance may be helpful in

**Table Resources for caregivers**

American Academy of Sleep Medicine:	<a href="http://www.sleepeducation.com/pdf/sleepdiary.pdf">http://www.sleepeducation.com/pdf/sleepdiary.pdf</a>
National Institute on Aging:	<a href="http://www.nia.nih.gov/HealthInformation/Publications/ExerciseGuide/">http://www.nia.nih.gov/HealthInformation/Publications/ExerciseGuide/</a>
Alzheimer's Disease Education and Referral Center of the National Institute on Aging:	<a href="http://www.nia.nih.gov/Alzheimers/">http://www.nia.nih.gov/Alzheimers/</a>
Alzheimer's Association:	<a href="http://www.alz.org/national/documents/brochure_activities.pdf">http://www.alz.org/national/documents/brochure_activities.pdf</a>
Popular books in print include:	<i>The 36-Hour Day: A Family Guide to Caring for People with Alzheimer Disease, Other Dementias, and Memory Loss in Later Life</i> , by Nancy L. Mace and Peter V. Rabins, from The Johns Hopkins University Press.

Created for *Geriatrics*

identifying specific target areas and gauging the efficacy of a proposed intervention. Because performing a sleep study with polysomnography is impractical and self-report is unreliable in this patient population, a sleep diary filled out by the caregiver is often the best alternative. A sample 2-week sleep diary is available online from the American Academy of Sleep Medicine (Table).

When initial evaluation fails to identify another medical or psychiatric condition as the cause of insomnia, it is prudent to consider non-pharmacologic treatments as a first-line intervention. Three modalities will be emphasized here—light therapy, exercise, and sleep hygiene—that were chosen on the basis of available evidence and applicability to patients typically seen in outpatient primary care practice. All 3 were components of a comprehensive sleep education program in the Nighttime Insomnia Treatment and Education for Alzheimer's Disease (NITE-AD) study, the first clinical trial to date, funded by the National Institute of Mental Health, to have examined the efficacy of non-pharmacologic thera-

pies for treating sleep disturbances in community-dwelling patients with Alzheimer's disease.<sup>12</sup>

### Light therapy

Exposure to light of sufficient intensity and duration can have marked effects on an individual's mood and sleep. Bright-light therapy has a proven indication for treatment of winter depression, or seasonal affective disorders. It is also one of the most widely studied non-pharmacologic interventions for sleep and behavioral symptoms in dementia patients. NITE-AD, the randomized, controlled trial using light exposure as part of its research protocol, demonstrated significant, 32% reductions from baseline in nighttime awakenings and total time awake at night compared with control subjects who worsened on both measures.<sup>12</sup> Patients and caregivers found this treatment feasible, with high compliance with the daily light box recommendation during two 3-week active treatment periods and at 6-month follow-up.

Physicians must overcome several challenges in recommending and implementing home-based light treatment. First, light therapy requires a light source of sufficient luminosity

to affect circadian phase-shift, with most studies exposing patients to 1000 to 10,000 lux for 30 to 90 minutes, far greater than can be achieved with ordinary home lighting. Thus, it is necessary to purchase specialized light equipment, ie, a "light box." These are readily available from online retailers and they range from around \$130 for a smaller lamp to \$300 for the unit used in the NITE-AD study. Although this upfront cost may seem prohibitive to some patients and their caregivers, it is comparable to costs of pharmacologic treatment, given that a month's supply of zolpidem (Ambien) costs \$130.

2,500 lux of full-spectrum light for 1 hour each day.

Caregivers who are struggling to ensure at least a 30-minute seated treatment time may need assistance to identify and plan sedentary activities to help keep patients in position during light-therapy sessions. Resources are available from the Alzheimer's Association and the Alzheimer's Disease Education and Referral Center of the National Institute on Aging (Table). Caregivers may also find helpful information in several popular books in print.

**Exercise**

Physical exercise is an important component of non-pharmacologic therapy for sleep disturbances. In addition to the benefit of improving sleep, evidence from a randomized, controlled trial suggests that a home-based exercise program combined with behavioral management can reduce functional dependence, improve physical health and depression, and delay institutionalization among patients with Alzheimer's disease.<sup>12,13</sup> A supervised exercise program in community-dwelling individuals is feasible. Most persons with dementia were able to walk for 30 or more minutes per day in one study.<sup>12</sup>

A variety of other exercise protocols have been used in clinical trials for patients with dementia. These protocols ranged from walking to more comprehensive programs including aerobic/endurance activities, strength training, balance, and flexibility training. The main challenge to implementing these, as with all behavioral interventions, is the required caregiver time. Nevertheless, a primary care clinic can be an ideal setting for encouraging patients to increase their physical activity level. Tailored exercise prescriptions delivered in the primary

care practice setting have been shown to improve physical fitness and exercise adherence in older (age > 65 years), community-dwelling adults.<sup>14</sup> Patients with dementia and caregivers should be instructed to walk for exercise daily for 30 minutes, preferably outside in natural light, weather permitting.<sup>12</sup> Frail patients can start with shorter walking intervals and gradually build up over time.

Information regarding exercise safety, as well as sample endurance, strength, balance, and stretching exercises, is available in the Exercise Guide distributed by the National Institute on Aging (Table). Primary care physicians can encourage patients to try a new exercise from the guide every day.

**Sleep hygiene**

Sleep hygiene refers to an individual's sleep habits and routines. It is often believed that establishing good sleep practices is the first-line treatment for all patients with insomnia. There is now ample clinical and empirical evidence to suggest that behavioral interventions, aimed at improving sleep

**Behavioral interventions can be helpful in treating nighttime disturbances.**

hygiene, can be helpful in treating sleep and nighttime disturbances in dementia patients.<sup>12,15,16</sup> The feasibility of changing sleep routines in community-dwelling dementia patients hinges on the primary care provider's help in developing an individualized behavioral plan tailored to the caregiver's particular situation. In the NITE-AD study, compared with the patients whose caregivers received only educational materials, patients whose caregivers received active as-



Network

TOOLS

There are more than a dozen handouts on sleep disorders available online at [modernmedicine.com](http://modernmedicine.com) that can be shared with caregivers.

[www.geri.com/disorders](http://www.geri.com/disorders)

Another potential limitation is that a demented patient may not be able to understand and follow light therapy treatment instructions. A caregiver is usually necessary to ensure that the patient remains seated and faces the light source, which should be placed at a distance of 2 to 3 feet within a 45° visual field. It is imperative that the patient does not sleep or nap during treatment because light must fall onto the retina to influence the circadian system. Patients can participate in other activities such as reading, eating, conversing, or watching television (the light box can be placed on top of the television) during light-treatment sessions. Light exposure treatment should be within a 3-hour window before the patient's habitual bedtime, except for patients who already have extremely late bedtimes. In the NITE-AD study, patients used a light box delivering approximately

sistance in setting up and implementing a sleep-hygiene program were more likely to maintain a consistent bedtime (83% vs 38%) and rising time (96% vs 59%) schedule, and were less likely to nap during the daytime (70% vs 28%).<sup>16</sup>

Prior to formulating an individualized sleep-hygiene program, it is worthwhile to screen for patients who would benefit the most from intensive behavioral intervention. Primary care physicians may start by obtaining details on the patient's baseline sleeping habits, using either caregiver reports or, ideally, a sleep-data diary kept for at least 1 week.

Patients who need to make changes in their bedtime, rising time, or daytime napping schedules are candidates for sleep-hygiene changes and should receive further instruction.<sup>16</sup> Caregivers may require assistance in identifying desirable bed and rising times and in adhering to these within a 30-minute leeway. Caregivers should be encouraged to limit patients' naps to 30 minutes or less and to eliminate naps after 1 pm altogether. Effort should also be devoted to identifying triggers for nighttime awakenings and to devise strategies for eliminating them. Common culprits include things such as nighttime noise and light, and incontinence. Some helpful behavioral strategies to address these are keeping sleeping areas dark, turning off the television at night, avoiding excessive fluid intake, and restricting caffeinated beverages in the evening. A more comprehensive list of educational information on sleep hygiene, including environmental, dietary, and health guidelines, such as that given to all subjects participating in the NITE-AD project, can be found in McCurry et al.<sup>15,16</sup>

The main obstacle to implementing sleep-hygiene changes in persons with dementia is the requirement for significant time and effort from caregivers, which may contribute to caregiver burden. As already alluded to, it is crucial for primary care providers to make specific suggestions and to troubleshoot problems that arise in caregivers' attempts to change sleep and activity routines, as opposed to having them rely on written educational materials alone. For example, it could be very challenging to keep individuals from napping without a concrete plan for keeping them occupied, active, and awake during daytime. Scheduling a long walk or another type of physical activity in the afternoon may be helpful, but any plan must take into account the caregiver's ability to follow through with the recommendation, and there must be collaboration on possible alternatives.

**Conclusion**

Treatment of insomnia in persons with dementia presents a number of challenges for caregivers and primary care



**industry matter**

**Practice Management Toolkit**

**Practical Information and Expert Advice You Need to Manage Your Practice**

**Discover How-To:**

- Boost your bottom line
- Add services without big debt
- Market your practice
- Provide staff benefits that won't cost a bundle
- Avoid a threat worse than Malpractice
- and much more ...



**Your Price \$149.95**



Vital Signs of a Healthy Practice

**Your Price \$26.95**



A Handbook to Marketing Your Practice

**Your Price \$24.95**



27 Proven Marketing Strategies to Boost Your Practice Profits

**Your Price \$199.00**



Adding Ancillary Services Combo

**Your Price \$59.95**

CONTEMPORARY OB/GYN

CONTEMPORARY pediatrics

Medical Economics

DermatologyTimes

OphthalmologyTimes

Cosmetic SURGERY TIMES

Geriatrics

Urology Times

888-480-0580

[www.industry.com/healthcare.aspx](http://www.industry.com/healthcare.aspx)

**Click. Shop. Learn.**

physicians. Despite the ubiquitous nature of sleep disturbances in dementia patients, few evidence-based guidelines exist to address this important problem. In clinical practice it often becomes necessary to combine several approaches, including behavioral and environmental interventions, as well as pharmacologic therapies. If other neuropsychiatric comorbidities are present, medications with sedative properties such as mirtazapine (Remeron) for depression can be prescribed at bedtime.<sup>8</sup> Pharmacologic treatments could also be considered for primary sleep disturbance when other approaches have failed, but there are few data on the efficacy of specific agents.<sup>8</sup> Although more large-scale, randomized, controlled trials are also needed on non-pharmacologic interventions, preliminary evidence from studies such as NITE-AD demonstrates that even brief trials of light therapy, exercise, and sleep-hygiene changes are efficacious and feasible with com-

munity-dwelling patients who suffer from dementia.

**References**

1. McCurry SM, Logsdon RG, Teri L, et al. Characteristics of sleep disturbance in community-dwelling Alzheimer's disease patients. *J Geriatr Psychiatry Neurol.* 1999; 12(2):53-59.
2. Pollak CP, Perlick D. Sleep problems and institutionalization of the elderly. *J Geriatr Psychiatry Neurol.* 1991;4(4):204-210.
3. Cricco M, Simonsick EM, Foley DJ. The impact of insomnia on cognitive functioning in older adults. *J Am Geriatr Soc.* 2001; 49(9):1185-1189.
4. Brassington GS, King AC, Bliwise DL. Sleep problems as a risk factor for falls in a sample of community-dwelling adults aged 64-99 years. *J Am Geriatr Soc.* 2000; 48(10):1234-1240.
5. Manabe K, Matsui T, Yamaya M, et al. Sleep patterns and mortality among elderly patients in a geriatric hospital. *Gerontology.* 2000;46(6):318-322.
6. Glass J, Lanctot K, Herrmann N, et al. Sedative hypnotics in older people with insomnia: meta-analysis of risks and benefits. *BMJ.* 2005;331(7526):1169.
7. Sink KM, Holden KF, Yaffe K. Pharmacological treatment of neuropsychiatric symptoms of dementia. *JAMA.* 2005; 293(5):596-608.
8. APA Work Group on Alzheimer's Disease and Other Dementias, Rabins P, Blacker

- D, Rovner B, et al. American Psychiatric Association practice guideline for the treatment of patients with Alzheimer's disease and other dementias. Second edition. *Am J Psychiatry.* 2007;164(12 Suppl):5-56.
9. Vitiello MV, Borson S. Sleep disturbances in patients with Alzheimer's disease. *CNS Drugs.* 2001;15(10):777-796.
10. Ancoli-Israel S. Insomnia in the elderly: a review for the primary care practitioner. *Sleep.* 2000;23 (Suppl 1):S23-30.
11. Ancoli-Israel S, Ayalon L. Diagnosis and treatment of sleep disorders in older adults. *Am J Geriatr Psychiatry.* 2006;14(2):95-103.
12. McCurry SM, Gibbons LE, Logsdon RG, et al. Nighttime insomnia treatment and education for Alzheimer's disease. *J Am Geriatr Soc.* 2005;53(5):793-802.
13. Teri L, Gibbons LE, McCurry SM, et al. Exercise plus behavioral management in patients with Alzheimer Disease. *JAMA.* 2003;290(15):2015-2022.
14. Petrella RJ, Koval JJ, Cunningham DA, Paterson DH. Can primary care doctors prescribe exercise to improve fitness? The Step Test Exercise Prescription (STEP) project. *Am J Prev Med.* 2003;24(4):316-322.
15. McCurry SM, Gibbons LE, Logsdon RG, et al. Training caregivers to change the sleep hygiene practices of patients with dementia: the NITE-AD project. *J Am Geriatr Soc.* 2003;51(10):1455-1460.
16. McCurry SM, Longsdon RG, Vitiello MV, Teri L. Treatment of sleep and nighttime disturbances in Alzheimer's disease: a behavioral management approach. *Sleep Med.* 2004;5(4):373-377.

**DIABETIC RETINOPATHY**

continued from pg 20

3. Klein R, Klein BE, Moss SE, et al. The Wisconsin epidemiologic study of diabetic retinopathy. III. Prevalence and risk of diabetic retinopathy when age at diagnosis is 30 or more years. *Arch Ophthalmol.* 1984;102(4):527-532.
4. Saaddine JB, Honeycutt AA, Venkat Narayan KM, et al. Projection of diabetic retinopathy and other major eye diseases among people with diabetes mellitus, United States, 2005-2050. *Arch Ophthalmol.* 2008;126(12):1740-1747.
5. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med.* 1993;329(14):977-986.
6. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet.* 1998;352(9131):837-853.
7. UK Prospective Diabetes Study (UKPDS) Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. *BMJ.* 1998;317(7160):703-713.
8. West SK, Munoz B, Klein R, et al. Risk factors for Type II diabetes and diabetic

- retinopathy in a Mexican-american population: Proyecto VER. *Am J Ophthalmol.* 2002;134(2):390-398.
9. Keenan HA, Costacou T, Sun JK, et al. Clinical factors associated with resistance to microvascular complications in diabetic patients of extreme disease duration: the 50-year medalist study. *Diabetes Care.* 2007;30(8):1995-1997.
10. Frank RN. Diabetic retinopathy. *N Engl J Med.* 2004;350(1):48-58.
11. Smith LE, Kopchick JJ, Chen W, et al. Essential role of growth hormone in ischemia-induced retinal neovascularization. *Science.* 1997;276(5319):1706-1709.
12. Gariano RF, Gardner TW. Retinal angiogenesis in development and disease. *Nature.* 2005;438(7070):960-966.
13. Adamis AP, Berman AJ. Immunological mechanisms in the pathogenesis of diabetic retinopathy. *Semin Immunopathol.* 2008;30(2):65-84.
14. Early Treatment Diabetic Retinopathy Study Research Group. Photocoagulation for diabetic macular edema. Early Treatment Diabetic Retinopathy Study Report number 1. *Arch Ophthalmol.* 1985;103(12):1796-1806.
15. Cunningham MA, Edelman JL, Kaushal S. Intravitreal steroids for macular edema: the past, the present, and the future. *Surv*

- Ophthalmol.* 2008;53(2):139-49.
16. Avery RL, Pearlman J, Pieramici DJ, et al. Intravitreal bevacizumab (Avastin) in the treatment of proliferative diabetic retinopathy. *Ophthalmology.* 2006;113(10):1695.e1-15.
17. Early Treatment Diabetic Retinopathy Study Research Group. Techniques for scatter and local photocoagulation treatment of diabetic retinopathy: Early Treatment Diabetic Retinopathy Study Report no. 3. *Int Ophthalmol Clin.* 1987;27(4):254-264.
18. Early Treatment Diabetic Retinopathy Study Research Group. Photocoagulation for diabetic retinopathy. Early Treatment Diabetic Retinopathy Study Report number 9. *Arch Ophthalmol.* 1991;98(5 suppl):766-785.
19. The Diabetes Control and Complications Trial Research Group. Effect of pregnancy on microvascular complications in the diabetes control and complications trial. *Diabetes Care.* 2001;23(8):1084-1091.
20. Khadem JJ, Buzney SM, Alich KS. Practice patterns in diabetic retinopathy: part 1: analysis of retinopathy follow-up. *Arch Ophthalmol.* 1999;117(6):815-820.
21. Zeimer R, Zou S, Meeder T, Quinn K, Vitale S. A fundus camera dedicated to the screening of diabetic retinopathy in the primary-care physician's office. *Invest Ophthalmol Vis Sci.* 2002;43(5):1581-1587.