

Insomnia in Older Adults with Dementia

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Sleep disturbances are frequently seen among older adults with dementia, leading to significant distress for both patients and their caregivers. It is likely that neuronal loss in key areas of the brain contributes to sleep disturbances in this population. When evaluating older adults with dementia and insomnia, try to obtain information regarding all details of their sleep, and determine whether medical, psychiatric, or environmental factors may be contributors. In treating sleep disturbances in older adults with dementia, behavioural interventions should first be used to improve sleep hygiene. At the present time, there are not enough data to standardize recommendations for pharmacological treatment of insomnia in this population, so treatment should be guided by attempting to minimize potential side effects and interactions with other medications.

Key words: sleep, dementia, older adults, sleep hygiene, pharmacological treatment of insomnia

Introduction

Sleep disturbances are common among individuals with dementia—about 50% of this population experience sleep difficulties of some kind.¹ The prevalence of insomnia among older adults with dementia living in the community is similar to that of those living in long-term care (LTC) facilities.² Insomnia is not an invariable sequela of dementia, but it can have devastating consequences for these individuals and their caretakers. Indeed, sleep difficulties in older people with insomnia are a frequent cause of behavioural disturbances and falls and are often cited as primary reasons for caregiver burden and LTC placement.³

Physiology of Sleep in Dementia

Sleep disturbances among people with Alzheimer's disease (AD) may be in part the result of neuronal losses in the suprachiasmatic nucleus, a region in the hypothalamus that regulates sleep and circadian rhythms.⁴ Sleep changes in this

population include decreased total sleep time, increased sleep latency and nighttime awakenings, and decreased slow wave sleep, sleep spindles, and K complexes.^{5,6} Older adults with AD also have decreased rapid eye movement (REM) sleep, which may be related to diminished cholinergic activity in the brain.⁷

Electroencephalographic findings such as decreased amounts of slow wave (Stages 3 and 4) and REM sleep may correlate with dementia severity (Figure 1).⁸ As a result, many individuals with dementia have problematic sleep-wake cycle disturbances including increased daytime sleepiness and napping, which create further sleep difficulties at night. Most problematic may be late-day episodes of increased confusion, agitation, and psychosis known as sundowning.⁹ Among individuals with AD, sundowning has been shown to be associated with increased rates of cognitive decline and caregiver distress.¹⁰

Clinical Evaluation of Insomnia

Given how common sleep disturbances are in the older adult with dementia, it is recommended that clinicians ask about sleep at least during their initial evaluation (but preferably at each visit). When evaluating someone who has dementia for a sleep disorder, it is crucial that the clinician obtain collateral information from a family member or caretaker who lives with the patient and is able to characterize the specifics of the problem (see Table 1). There is no universally used screening test for insomnia in patients with dementia. Thus, when possible, it is helpful to have the caretaker keep a sleep diary to record 24-hour sleep-wakefulness patterns. This should include nighttime sleep onset, total sleep time, and the specifics of the patient's sleep difficulties, such as the frequency and severity of sleep disruptions and potential movement or breathing difficulties. It should also include how often the patient is waking up because of a need to urinate. Other events such as daytime napping, episodes of sundowning, and wandering should also be monitored.¹¹

It is certainly important to have a sense of the patient's home environment. Have there been any recent changes? Does the patient spend most of the day in bed? Even knowledge of such factors as light, temperature, and the presence of pets may be of use. The clinician should be made aware of habits that potentially affect sleep, including diet and use of caffeine, alcohol, and tobacco.¹²

The clinician should carefully look at all comorbid medical and psychiatric issues to determine whether they may be contributing to the sleep disturbance. Primary sleep disorders such as restless legs syndrome, periodic limb movement disorder, and sleep disordered breathing (generally involving obstructive sleep apnea) are common among older adults with dementia and may require a careful history-taking for accurate identification and treatment. Medical problems such as pain syndromes, chronic obstructive pulmonary disease, and gastroesophageal reflux disease can affect sleep in this population. Additionally, sleep disturbances

Table 1: Clinical Evaluation of Insomnia in an Older Adult with Dementia

What is the problem? When do you suspect insomnia?

1. Obtain as much information as possible from the patient, family, and caregivers.
2. Have a caregiver keep a sleep diary recording 24-hour sleep-wakefulness patterns for 1–2 weeks.
3. Determine problematic symptoms (duration, onset, frequency of disruptions, presence of a movement/breathing disorder, excessive daytime napping, sundowning, wandering).

What are the causes and contributing factors?

1. Have there been recent changes to the home environment (e.g., move to assisted living or a long-term care facility)?
2. Does the patient have a primary sleep disorder (e.g., obstructive sleep apnea, restless legs syndrome)?
3. Is there a medical issue impacting sleep (e.g., pain, gastroesophageal reflux disease, chronic obstructive pulmonary disease)?
4. Is there a psychiatric disorder impacting sleep (e.g., depression)?
5. Is there a medication that may be contributing to a sleep disturbance (e.g., analgesic, psychotropic, antihypertensive, anti-parkinsonian medication)?

are commonly seen in the prodrome of delirium, which is more common in patients with dementia. Many psychiatric disorders disrupt sleep, including depression (which is a major comorbidity with dementia), bipolar disorder, anxiety disorders, and psychosis, which may be from a long-term psychotic disorder or a manifestation of the dementia. Finally, the clinician should obtain a comprehensive list of medications (prescribed and over the counter) and details of exactly when they are taken. Sleep can be adversely affected by many commonly prescribed medications, including analgesics, antihypertensives, psychotropics, anti-parkinsonian medications, bronchodilators, and cholinesterase inhibitors.^{11,12} Similarly, a modification in the patient's medication regimen may lead to mental status changes that may secondarily affect sleep.

Nonpharmacological Treatment of Insomnia in Older Adults with Dementia
Sleep Hygiene

Both patients and their caregivers should be educated as to how they can improve sleep hygiene. Several studies have found that simply teaching caregivers about these behavioural techniques improved sleep in community-dwelling persons with AD.^{5,13} Examples of ways to improve sleep hygiene include mak-

ing environmental changes such as maintaining a consistent sleep schedule, minimizing noise and light (including the television), and keeping the bedroom at a comfortable temperature; making dietary and health changes such as reducing late-day use of alcohol, tobacco, and caffeine, having the patient eat a light snack instead of a heavy meal at night, and decreasing late-day fluid intake (so that the patient can avoid waking up to urinate); and increasing daytime activity including regular exercise early in the day (exercising after dinner can adversely affect sleep) and minimizing daytime napping (see Table 2).¹⁴

Light Therapy

The little research that has been done on the topic of light therapy is promising but inconclusive. There is evidence that giving bright light therapy can normalize circadian rhythms.¹⁵ While some research suggests that this may contribute to improvements in sleep and behaviour disorders in older adults with dementia,^{16–18} other studies have not been able to make this link.¹⁹ Nevertheless, it would seem to be useful for institutions to find ways to maximize resident exposure to bright light. Practically, the ways to best implement light therapy in this population, such as optimizing timing, light dose, and light frequency, have yet to be determined.

Pharmacological Treatment of Insomnia in Older Adults with Dementia

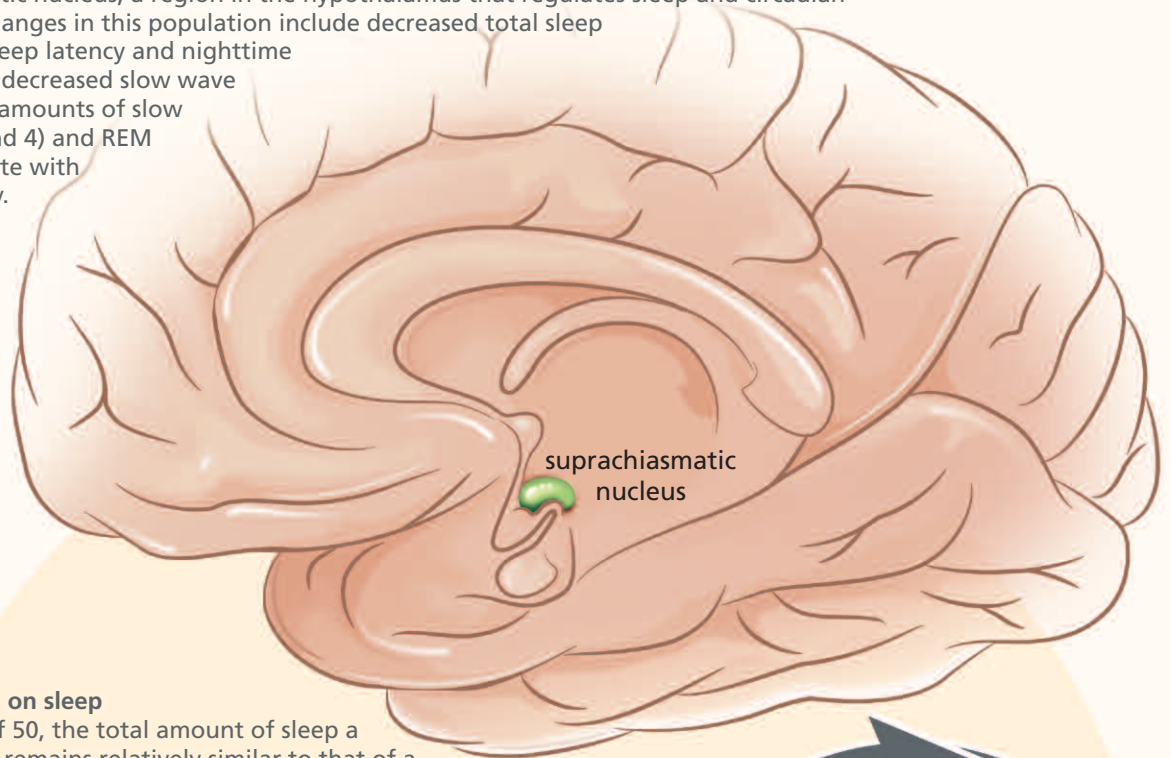
Consideration of pharmacological agents to treat insomnia in older adults with dementia is an appropriate measure to take if treatment of the underlying cause is not sufficiently helpful and if nonpharmacological treatments are not working. Unfortunately, there are no clear guidelines to provide direction in this regard as research on this topic is remarkably scarce. Clinicians should closely monitor patients who have been prescribed any new medication for insomnia. As a rule, it is prudent to begin any agent at the lowest possible dose with the intention of using it in a time-limited manner (several weeks at most) and, if possible, on an as-needed basis. When choosing a pharmacological agent for insomnia, the clinician should be cognizant of potential side effects, which are often magnified in older adults with dementia (see Table 3).

Melatonin

The hormone melatonin, which is produced in the pineal gland and is known to regulate the sleep-wake cycle, is produced in decreased quantities in older people. Recent clinical trials have shown that melatonin can promote sleep in people with AD.²⁰ However, a recent multi-centre, placebo-controlled study demonstrated the relative safety of mela-

Figure 1:
Insomnia in Older Adults with Dementia

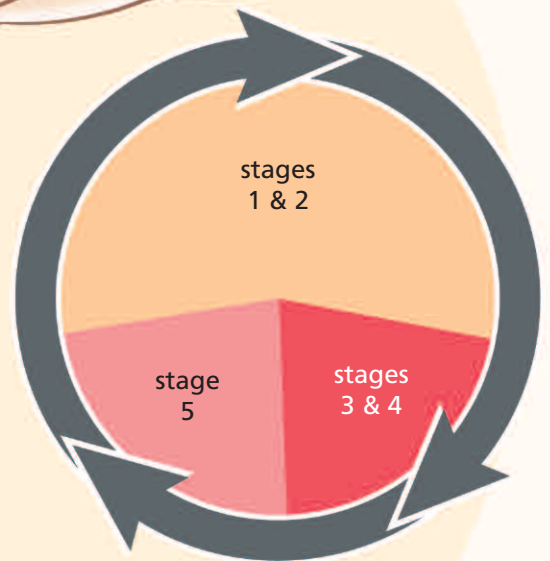
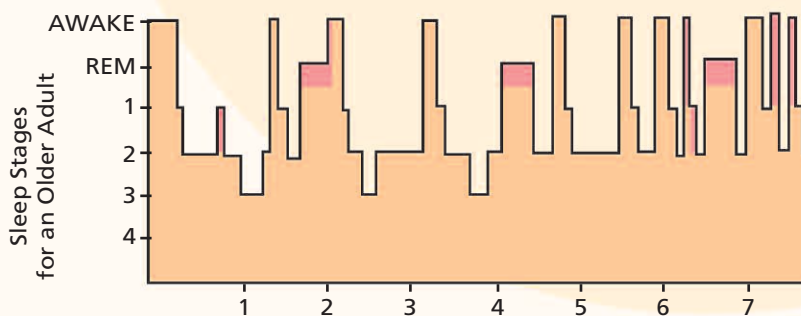
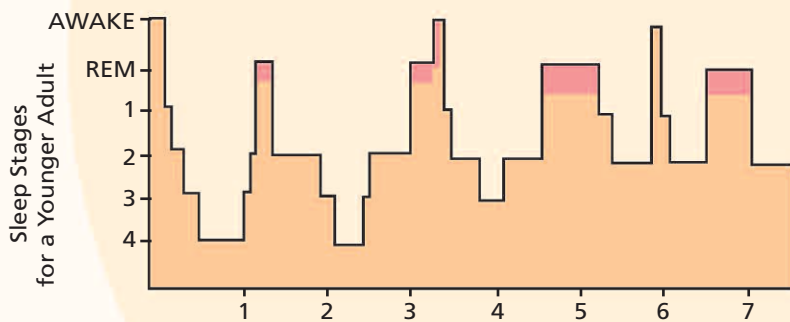
Sleep disturbances in people with Alzheimer’s disease may in part be the result of neuronal loss in the suprachiasmatic nucleus, a region in the hypothalamus that regulates sleep and circadian rhythms. Sleep changes in this population include decreased total sleep time, increased sleep latency and nighttime awakenings, and decreased slow wave sleep. Decreased amounts of slow wave (stages 3 and 4) and REM sleep may correlate with dementia severity.



suprachiasmatic nucleus

Effects of aging on sleep

After the age of 50, the total amount of sleep a person requires remains relatively similar to that of a younger adult; however, the amount of sleep becomes more fragmented, with frequent night wakings. The proportion of REM sleep remains relatively unchanged. The proportion of slow wave sleep largely decreases relative to total sleep time.



- stages 1 & 2**
first fallen asleep, but not yet in a deep sleep
- stages 3 & 4**
deep, restful sleep; decreased heart rate and breathing
- stage 5**
brain is active and eyes move in REM

Table 2: Improving Sleep Hygiene in an Older Adult with Dementia

Are There Environmental Factors That Can Be Changed?

1. Minimizing nighttime noise and light. For example, use dark curtains or a sleep mask
2. Maintaining a consistent sleep schedule
3. Sleeping with the television and/or radio turned off or moving these items into another room
4. Using the bed only for sleeping rather than watching television or reading
5. Using relaxation strategies such as meditation tapes, progressive muscle relaxation, and deep abdominal breathing may be helpful
6. When possible, minimizing use of medications that adversely affect sleep, including analgesics, antihypertensives, psychotropics, anti-parkinsonian medications, bronchodilators, and cholinesterase inhibitors

Are There Lifestyle Changes That Can Be Made?

1. Not having caffeine for six hours, or alcohol or tobacco for two hours, prior to bedtime
2. Decreasing late-day fluid intake to minimize need to urinate at night
3. Eating a light snack for supper instead of a heavy meal
4. Exercising regularly, while being sure to finish three hours prior to bedtime

tonin but showed minimal efficacy in a similar population.²¹ As melatonin is an over-the-counter supplement, there is no formal regulation or standardization of dosing, making it difficult to give recommendations around its use. Studies have used doses ranging from 0.3 to 6 mg. There are little data on the efficacy of the melatonin-receptor agonist ramelteon in older adults with dementia.

Antidepressants

Trazodone is a serotonin-specific antidepressant that is thought empirically to be useful in treating insomnia in older adults with dementia, regardless of whether they have a comorbid depressive disorder. In terms of dosing, trazodone is generally started at 12.5–25 mg at bedtime with a maximum dose of 100 mg. Trazodone can cause orthostatic hypotension related to its weak alpha-adrenergic activity.²²

Mirtazapine is an antidepressant that may be particularly helpful in the setting of comorbid depression, and evidence suggests that it is well tolerated in this population.²³ Mirtazapine may be helpful in treating both mood and neurovegetative symptoms such as insomnia and anorexia. Somnolence and weight gain

are the most common side effects, which may in fact be useful in many settings. Mirtazapine is generally dosed at 7.5–15 mg at bedtime, and it is notable that lower doses of this medication are generally more sedating.

Tricyclic antidepressants are generally used only as a last resort given concern about their potential side effects including confusion, urinary retention, orthostasis, and cardiac conduction delays. A recent study demonstrated that low-dose doxepin (3–6 mg) improved sleep efficiency and was well tolerated by older adults (albeit, those without dementia).²⁴ However, these data may not apply to individuals with AD who have an underlying cholinergic deficiency and may be particularly susceptible to doxepin’s anticholinergic side effects.

Antipsychotics

In the setting of comorbid psychosis or agitation affecting sleep in this population, atypical antipsychotics may be an appropriate option. Again, when choosing an agent, one must consider potential side effects. Quetiapine is felt to be the most sedating agent in this class, with dosing beginning at 6.25–12.5 mg at bedtime, with room for titration. However,

quetiapine can cause orthostasis. Olanzapine may be helpful as well, although it is the most anticholinergic of the atypical antipsychotics. Initial doses are 1.25–2.5 mg at bedtime. Risperidone is generally started at 0.25–0.5 mg at bedtime. As risperidone is closest structurally to older neuroleptics, it is the most likely to cause extrapyramidal side effects. Aripiprazole is generally too activating to be used in this setting.^{25,26}

As a class, atypical antipsychotics may increase the relative risk for stroke and sudden cardiac death²⁷ and appear to increase overall mortality in older adults with dementia; therefore, before beginning one of these medications, it is vital to have a discussion of the risks and benefits with the patient and family.

Benzodiazepine and Anticholinergic Hypnotics

Benzodiazepines and related agents such as zolpidem are often effective hypnotics in younger populations; however, in older individuals, they can cause troublesome side effects such as falls, excessive daytime sedation, an increased risk for motor vehicle accidents, paradoxical agitation, and memory impairment.²² While there are limited data that benzodiazepines and related agents can be effective in older populations with dementia when used within formal prescribing guidelines (i.e., using the smallest possible doses of short-acting agents),²⁸ these medications should be used with caution in older adults with dementia, who are most vulnerable to these side effects.

In addition, medications with anticholinergic properties should not be used for older adults with dementia, who generally have drastically decreased cholinergic activity in their brains. This makes medications such as diphenhydramine less than ideal in this population as these drugs are likely to be deliriogenic and potentially cause such side effects as constipation, urinary retention, and dry mouth.²⁹

Conclusion

Clearly, there are many challenges that a clinician faces in evaluating and treating

Table 3: Pharmacological Agents Used to Treat Insomnia in the Older Adult with Dementia

Medication	Starting Dose Range	Therapeutic Dose Range	Potential Side Effects
Melatonin	0.3–3 mg	1–6mg	Headaches, nausea, dizziness
Trazodone	12.5–25 mg	25–100mg	Orthostasis, somnolence
Mirtazapine	7.5–15 mg	7.5–15mg	Somnolence, increased appetite
Quetiapine	6.25–12.5mg	12.5–50 mg	Orthostasis, sedation, may increase relative risk of CVAs and sudden cardiac death
Olanzapine	1.25–2.5 mg	2.5–5mg	Weight gain, anticholinergic side effects, sedation, orthostasis, may increase relative risk of CVAs and sudden cardiac death
Risperidone	0.25–0.5 mg	0.5–2mg	Orthostasis, tachycardia, dysrhythmias, elevated prolactin, EPS, may increase relative risk of CVAs and sudden cardiac death
Ramelteon	8 mg	8mg	Somnolence, dizziness, nausea
Zolpidem	2.5–5 mg	2.5–5mg	Confusion, sedation, increased fall risk, agitation

CVA = cerebrovascular accident; EPS = extrapyramidal syndrome.

insomnia in an older patient with dementia. Nevertheless, a thorough workup should be performed to best elucidate both the character of the sleep disorder as well as all potential etiologies. This often requires collateral information from a caregiver. Steps should be made to enhance sleep hygiene. If behavioural treatments do not fully address the problem, then the clinician should carefully consider the benefits and risks of pharmacological treatments. Benzodiazepine

and anticholinergic agents are generally troublesome in this population because of their potential to cause a wide range of adverse effects. This is a burgeoning field, and there is hope that the near future will provide more evidence to guide the treatment of older adults with dementia with insomnia.



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Key Points

Damage to neuronal pathways, particularly in the suprachiasmatic nucleus, as well as changes in sleep architecture likely contribute to sleep disturbances in older adults with dementia.

When assessing sleep disturbances in someone with dementia, obtain details of the 24-hour sleep-wake cycle to better characterize the nature of the sleep disturbances.

Assess for medical, psychiatric, and environmental causes of insomnia. Additionally, many frequently used medications can contribute to insomnia in older adults with dementia.

The initial management of treating insomnia in this population should focus on improving sleep hygiene.

When choosing a pharmacological agent to treat insomnia in older adults with dementia, consider the potential side effects as well as interactions with other medications.

Clinical Pearls

Try to avoid prescribing benzodiazepine (or benzodiazepine-like drugs such as zolpidem) and anticholinergic medications in this population, which often have side effects that outweigh any potential benefits in older adults with dementia.

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