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Editorial

Sleep and the Nursing Home



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“Sleeping is no mean art;
for its sake one must
stay awake all day”

~Friederich Nietzsche

Adequate sleep is essential for maintaining normal function. It is now recognized that during sleep, brain cells shrink, allowing cerebrospinal fluid to bathe the cells and wash away toxins.¹ One of the toxins that is removed during sleep is amyloid-beta protein.² This removal of amyloid-beta protein results in neurofibrillary tangle formation, less blood-brain barrier damage, less amyloid-beta deposition in plaques, protection of mitochondria from apoptosis, and a decline in oxidative damage.³ Overall, sleep acts as the brain’s “dishwasher,” cleaning the brain so it is ready to return to optimal functioning when the person wakes up (Figure 1).

With aging there is a decrease in total sleep time.⁴ Slow-wave sleep and rapid eye movement (REM) sleep are the major components of the loss of sleep, while there is a small increase in stage 1 and stage 2 sleep.⁵ Older people are less exposed to bright light, leading to a disruption of circadian rhythms, perhaps best shown by the decline in melatonin.⁴ The lack of light exposure results in phase advancement, with older persons going to bed earlier (1900 to 2100 hours), but then waking up earlier (0300 to 0500 hours). Although most older persons have shorter sleep duration, a subset sleep excessive hours (>10 hours). These persons have a marked increase in mortality.⁶ Sleep questionnaires fail to recognize excessive sleepiness.⁷

In long-term care, these changes are exaggerated.⁸ Napping during the day becomes more common, with “sleep fragmentation” at night. Most residents have less than a continuous hour of sleep at any time.^{9,10} These changes are worse in persons with dementia. This is particularly true in persons with Lewy-Body dementia.¹¹ Persons with Alzheimer disease tend to have more marked circadian variation with phase advancement.¹² A study of insomnia in 8 countries reported that approximately 1 in 5 residents in long-term care (13%–30%) had insomnia.¹³ These sleep disruptions lead to an increase in falls,^{14–17} hip fractures,^{18–20} cognitive impairment,²¹ poor functionality,²² and a decrease in survival.^{23,24}

The reasons for sleep disturbance in nursing homes include both extrinsic and intrinsic causes. Environmental causes are highlighted

by nursing care interruptions, as well as noise and light at night.^{25–27} Inappropriate quality of light in nursing homes^{28,29} and failure to have outside time (less than 30 minutes a day) are major causes. Spending long times in bed, inactivity, and lack of physical activity all are important factors. These behaviors lead to loss of muscle mass (sarcopenia) and frailty.^{30–36} Intrinsic causes include multiple medical disorders and polypharmacy,^{37–41} depression,^{42–45} pain,^{46–48} and nocturia.^{49–52}

In this issue of your *Journal*, Auyeung et al⁵³ show an association of both high and low testosterone with sleep duration. Other studies have shown that low testosterone is related to sleep loss.⁵⁴ Testosterone levels decline with aging, and these levels are particularly low in nursing home residents.^{55,56} Sleep apnea also is associated with low testosterone,⁵⁷ and this is associated with increased fatigue⁵⁸ and dysphoria.⁵⁹ Recently it has been shown that after 6 months of treatment, testosterone does not make sleep apnea worse.⁶⁰ Whether or not the association of low testosterone with sleep length is “the chicken or the egg” remains to be determined.

Sleep Disorders

The major sleep disorders are sleep apnea, restless legs syndrome, periodic limb movement disorder, and REM sleep behavior disorder. Sleep apnea occurs in 25% to 50% of long-term care residents.^{61,62} Despite this high prevalence, sleep apnea is documented in only 0.5% (0.4%–0.6%) in nursing home residents.⁶³ Sleep apnea is associated with hypertension (including occult nighttime hypertension),⁶⁴ decreased pain tolerance,⁶⁵ falling asleep–related injuries,⁶⁶ impaired cognition,⁶⁷ diabetes, depression, and frailty.^{68–70} Observations of the presence of apneic episodes by nurses have a high sensitivity and specificity for the diagnosis of sleep apnea and other sleep-related disorders.⁷¹ Oximetry can be used to make a definitive diagnosis in the nursing home.^{71,72} The treatment of choice for sleep apnea is continuous positive airway pressure (CPAP).⁴ CPAP is often poorly tolerated by nursing home residents, in which case mandibular advancement splints can be effective for obstructive sleep apnea.⁷³

Restless legs syndrome occurs when the resident has uncomfortable feelings in his or her legs that is relieved by leg movement. Periodic limb movement disorder is a condition in which the legs kick while the resident is asleep, resulting in disturbed sleep. The treatment for these conditions is dopamine agonists, such as ropinirole. These conditions are often a precursor to and associated with Lewy-Body dementia.¹¹

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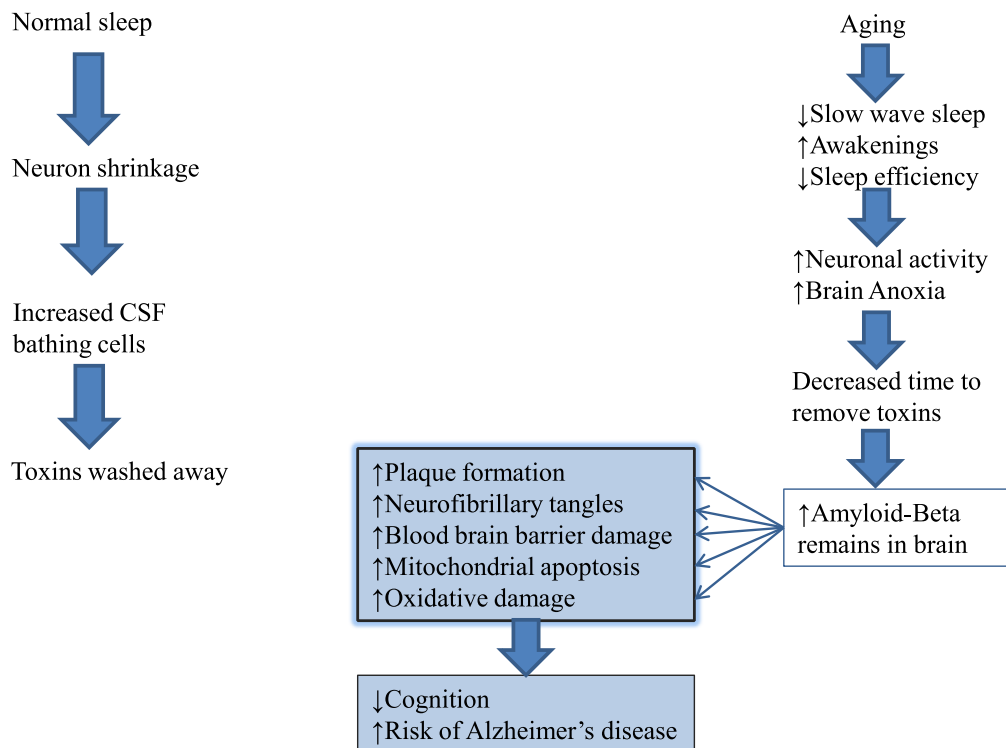


Fig. 1. Sleep as the brain's "dishwasher." CSF, cerebrospinal fluid.

Nonpharmacological Management of Poor Sleep in the Nursing Home

The primary treatment of insomnia (poor sleep) in long-term care is the same as at home (ie, sleep hygiene). The first approach should be natural light exposure during the day.⁷⁴ Use of low-level "bluish-white" lighting during the daytime increased total sleep time and sleep efficiency, and decreased depression and agitation.⁷⁵ Royer et al⁷⁶ reported similar effectiveness of 400-lux light in a long-term care facility. A review of the literature suggested that architectural design of long-term care facilities should involve programmable, 24-hour lighting algorithms taking into account light duration, intensity, and wavelength and lighting timing sequences.⁷⁷

Physical activity and social activation improves sleep quality.⁷⁸ Herrick et al⁷⁹ found resistance exercise 3 times a week reduced the apnea-hypopnea index in residents in nursing homes. Exercise for residents in wheelchairs leads to longer sleep duration, better sleep efficiency, and less dysphoria, which was maintained for 6 months.⁸⁰ Exercise also has been shown to decrease agitated behavior and improve sleep duration.⁸¹ As regular exercise has numerous other benefits, including improvement of cognition^{82–84} and better function,^{85–88} it would seem that it should be a staple of care in the long-term care setting.

Cognitive behavioral therapy has been shown to be as effective as medications in improving sleep.⁸⁹ Reduction of nighttime noise and sleep interruptions will improve sleep but it is extremely difficult to maintain this intervention in nursing homes.^{90–92}

Excessive need to urinate at night can be highly disruptive of sleep. Desmopressin given before sleep can reduce nocturia in carefully selected residents.⁹³ Limiting fluid intake after dinner and making sure that the male resident toilets standing up just before going to bed also decreases nocturia. Diuretic administration should be first thing in the morning and dosage reduced wherever possible.

Other useful strategies are to limit or eliminate naps during the day and avoid caffeine or alcohol. If individuals cannot sleep, they do

better if allowed to get out of bed at night, until they are tired. Finally, a small glass of hot milk and/or a snack at bedtime can be beneficial.

The nonpharmacological management for improving sleep is outlined in Table 1.

Pharmacological Treatment of Insomnia

It is not recommended that hypnotic medications are given every night to residents in nursing homes. They should be given only when the resident cannot fall asleep 30 minutes after going to bed. Although these are reasonable recommendations, they do not gel very well with the reality of long-term care life. A substantial number of residents have real sleep disorders, and the ability to limit daytime napping is not really feasible. Sleep hygiene methods are difficult to put in place. There are fewer staff in the evening,

Table 1
Nonpharmacological Management of Sleep in the Nursing Home

- 1 Natural light exposure, that is, spend time outside (30–60 minutes per day)
- 2 High-lux light in the morning and high-quality light during the rest of the day
- 3 Avoid nighttime disturbances
 - Limit light to a minimum
 - Limit noise to a minimum
 - Limit nighttime checks to a minimum
 - No bed alarms or buzzers
 - Choose appropriate roommate
- 4 Eliminate daytime naps
- 5 Get out of bed if the resident cannot fall asleep
- 6 Physical exercise (aerobic and resistance)
- 7 Cognitive behavioral therapy
- 8 Limit fluids after dinner
- 9 Avoid caffeine/alcohol after dinner
- 10 Reduce use of diuretics and stimulant medications
- 11 Have a small glass of warm milk and/or snack before going to bed
- 12 Limit time spent in bed during the day

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