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Sleep and Long-Term Care

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Long-term care (LTC) involves a range of support and services for people with chronic illness and disabilities who can not perform activities of daily living independently. It is expected that approximately 70% of adults older than 65 years of age will use some form of LTC.¹ For the purpose of this review, only studies of facility-based LTC settings are included, such as nursing homes, assisted living facilities, and continuing care retirement communities. Poor sleep increases the risk of LTC placement,² and sleep disturbance is extremely common among LTC residents.³ The identification and management of sleep disturbance in LTC residents is a vital, but perhaps underappreciated, aspect of offering high-quality care for this already compromised population.⁴ This review describes the nature and consequences of sleep disturbances in LTC, the clinical assessment and management of sleep disturbances in LTC, and the implications for future research and clinical practice.

POOR SLEEP AND THE RISK OF LONG-TERM CARE PLACEMENT

Spira and colleagues² prospectively examined whether poor sleep increased the risk of institutionalization in a large cohort of community-dwelling older women. They found that greater sleep fragmentation measured by wrist actigraphy substantially increased the likelihood of LTC placement after 5 years.²

Poor sleep may contribute to the increased risk of LTC placement for a variety of reasons. One explanation is that poor sleep leads to cognitive impairment. A metaanalysis of 77 studies among regional or national representative samples of older adults identified cognitive impairment as a key predictor of nursing home placement.⁵ Recent prospective cohort studies, using both objective and subjective measures of sleep quality, offered strong evidence that poor sleep led to cognitive decline in older adults.^{6,7} It is also possible that frequent nocturnal awakenings increase caregiver burden and stress, which prompts the institutionalization of older adults receiving care at home.⁸ However, one could argue that poor sleep in care recipients may not necessarily be linked to disturbed sleep in caregivers.⁹

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Some other explanations of how poor sleep increases the risk of LTC placement include sleep loss linked to chronic inflammation leading to functional impairment and declining health.^{10,11} Poor sleep may also be a side effect of prescribed medications, or it can be a sign of other comorbidities known to increase risk for institutionalization among older adults, such as depression.

Future research is necessary to discover the mechanisms linking sleep disturbance to the increased risk for LTC placement, and to evaluate if sleep promotion strategies could decrease the risk of institutionalization. As an attempt to prevent LTC placement, clinicians working with older adults should assess sleep on a regular basis, closely monitor individuals with highly fragmented or insufficient sleep, and provide nonpharmacologic strategies for improving sleep whenever possible.

SLEEP DISTURBANCE IN LONG-TERM CARE

Although common in older adults, sleep disturbances are even more prevalent and more severe in institutionalized older adults.¹² Compared with community-dwelling older adults, LTC residents with and without dementia showed significantly lower sleep efficiency, longer awake time, and more sleep fragmentation throughout the night as measured by actigraphy.¹³ In a study of 334 nursing home residents, 72.1% of the residents were classified as poor sleepers, and 49.6% were taking hypnotic medications.³ Poor sleep in LTC residents is common across countries and cultures. In a recent study of more than 4000 elderly nursing home residents from Israel and 7 European countries, the overall prevalence of insomnia was 24% (ranging from 13% to >30%). In this study, insomnia was defined by the presence of symptoms of difficulty falling asleep or staying asleep, waking up too early, restlessness, or nonrestful sleep at any time.¹⁴ Sleep disturbances are not only common, but they can also be persistent for up to 6 to 12 months, as reported in various LTC settings.^{15,16} The persistence of sleep disturbance may have profound impact on LTC residents.

CONSEQUENCES OF SLEEP DISTURBANCE IN LONG-TERM CARE

A large body of evidence exists supporting the negative consequences of poor sleep or sleep disturbance in general. For example, poor sleep is associated with worse physical function, including gait speed, in older adults.¹⁷ Sleep disturbance can adversely affect neuronal health, as supported by the observation that changes in sleep pattern increase the risk for dementia.¹⁸ Studies in LTC residents have linked sleep disturbance to decreased functional status,³ less functional recovery with rehabilitation,¹⁹ social disengagement,²⁰ greater risk of falls,²¹ frailty,²² agitation,²³ and higher mortality.²⁴

CLINICAL ASSESSMENT OF SLEEP DISTURBANCE IN LONG-TERM CARE

The diagnosis of sleep disturbance in residents of LTC is based on an in-depth clinical history from residents (if able), family members, and LTC staff; observations of daytime and nighttime sleep; and a physical examination. If indicated, polysomnography, sleep logs, actigraphy, questionnaires such as the Pittsburg Sleep Quality Index,²⁵ the Behavioral Indicators Test—Restless Legs,²⁶ STOP-Bang to screen for obstructive sleep apnea (OSA),

²⁷ and other diagnostics may be required. A referral to a sleep specialist may be indicated when a sleep disorder is suspected.²⁸ Before initiating treatment, characteristics and causes of sleep disturbances must be carefully investigated, and a diagnosis established.²⁹ Careful evaluation can help clinicians to avoid inappropriate treatments or missing important symptoms related to poor sleep quality.

FACTORS THAT CONTRIBUTE TO SLEEP DISTURBANCE IN LONG-TERM CARE

Sleep disturbance in LTC residents is likely to result from a variety of individual and environmental factors,³⁰ including age-related changes in sleep architecture, environmental noise, nocturnal care practices, physical inactivity, social disengagement, depression, dementia, sleep disorders, and polypharmacy.³¹ Understanding these factors will inform the development of strategies to improve sleep for LTC residents. Box 1 summarizes the factors that contribute to sleep disturbance in LTC.

Age-Related Factors

Older age independently predicts the existence of sleep disturbance in LTC residents.¹⁴ Sleep in older adults is characterized by frequent arousals, decreased deep sleep, and advanced sleep phase with the tendency to fall asleep earlier in the evening and wake up earlier in the morning.³² Although poor sleep should not be considered as a normal part of aging, age-related changes in sleep architecture and weakening of circadian entertainment may contribute to the sleep disturbance commonly seen in LTC residents.

Environmental Factors

Sleep in LTC can be interrupted by environmental factors such as noise, lighting, room temperature, room sharing, and nocturnal care activities. With residents seldom being taken outdoors, limited exposure to bright light during the day significantly contributes to circadian deregulation.³³ Environmental noise and incontinence care practices at night are responsible for a substantial amount of sleep disruption among LTC residents.³⁴ A recent national survey revealed that health care providers' knowledge of sleep was limited, and there was a general lack of awareness regarding sleep disturbance for patients with dementia.³⁵ This limited knowledge and lack of awareness from professionals may lead to care activities scheduled for the convenience of the staff even when they interfere with the residents' sleep.

Behavioral Factors

LTC residents tend to spend extended time in bed, are physically inactive, and are less engaged in social activities during the daytime.³⁶ Reduced daytime physical and social activities in LTC residents significantly contribute to their circadian rhythm abnormalities resulting in excessive daytime sleepiness and disturbed nighttime sleep.³⁶ Daytime napping is common among older LTC residents.³⁷ Although there is considerable controversy about the health-related consequences of napping among older adults, excessive daytime napping may lead to decreased nocturnal sleep and alter the sleep-wake cycle. Emotional distress,

isolation, loneliness, and the process of relocation to an LTC facility often lead to social disengagement and contribute to nocturnal sleep disturbances.³¹

Medical and Psychiatric Factors

Sleep complaints in older adults are often secondary to comorbidities.³⁸ The majority of LTC residents suffer from multiple chronic conditions that contribute to sleep disruptions, such as depression, dementia, chronic pain, nocturia, heart failure, and pulmonary diseases. For example, more than one-half of LTC residents have some form of dementia or cognitive impairment,³⁹ which may increase sleep fragmentation and excessive daytime sleepiness.⁴⁰

Nearly all residents take multiple medications to manage medical and psychiatric conditions.⁴¹ It is highly likely that some medications impact nighttime sleep and/or daytime alertness. Medications like diuretics or sympathomimetics can be particularly problematic when taken near bedtime.

Sleep disorders are common but may be under-diagnosed and undertreated among LTC residents. At least 40% of LTC residents with evidence of daytime sleepiness and nighttime sleep disturbance have OSA,⁴² with a much higher rate among residents with dementia.⁴¹ Unfortunately, clinicians rarely screen for or document OSA in LTC residents.⁴³ Unattended home sleep apnea testing using portable monitors is increasingly available for diagnosing OSA, and has demonstrated good sensitivity and specificity for detecting OSA for patients with a high pretest probability.^{44,45} Portable, unattended monitoring may be useful for diagnosing OSA in LTC residents who do not have nighttime confusion or dementia. Those with confusion and dementia are likely to remove the portable monitors resulting in a high percentage of missing data. Also, there is a scarcity of data validating home sleep testing in older adults, or in patients with significant medical comorbidities such as chronic obstructive pulmonary disease and congestive heart failure.⁴⁵

In addition to insomnia and OSA, other sleep disorders common in older LTC residents, particularly in those with dementia,^{46,47} are central disorders of hypersomnolence characterized by excessive sleepiness, specifically hypersomnia owing to a medical disorder, hypersomnia associated with a psychiatric disorder, and hypersomnia owing to a medication or substance; circadian rhythm sleep-wake disorders such as advanced sleep-wake phase disorder; and sleep-related movement disorders such as restless legs syndrome (RLS) and periodic limb movement disorder. RLS is associated with discomfort in the legs while at rest, along with an overwhelming desire to move while awake. Periodic limb movement disorder is a condition in which involuntary movements of the limbs occur during sleep. Because older LTC residents with dementia may be unable to respond to the RLS diagnostic interview, objective diagnostics are required for this population.⁴⁶ Richards and colleagues²⁶ recently validated an objective RLS diagnostic measure for use in persons with dementia, the Behavioral Indicators Test – Restless Legs. The Behavioral Indicators Test – Restless Legs consists of a 20-minute observation for 8 behavioral indicators and an assessment for the 6 clinical indicators. The frequency of the behavioral indicators (using the hand to hold or rub the leg or foot, rubbing legs or feet together, kicking, flexing against a surface, flexing as if pushing on a gas pedal [like a period leg movement], stretching or straightening legs or feet, crossing and uncrossing legs or feet, and fidgeting) are noted every 2 minutes during a

20-minute continuous observation in the late afternoon or evening. Composite scores range from 0 to 10 with higher scores indicating greater frequency of behaviors. The 6 clinical indicators of history of iron deficiency, discomfort in legs, daytime fatigue, difficulty falling asleep, family history of RLS, and diabetes (negative) are collected from chart review and interviews with patients (if able), caregivers, and family members. A composite score of 2 or more on the behavioral indicators section and score of 6 on the clinical indicators provides good evidence of a positive RLS diagnosis.

MANAGEMENT OF SLEEP DISTURBANCE IN LONG-TERM CARE

Summary and Management Goals

LTC residents (when able), in collaboration their families, physicians, and LTC staff, should together establish goals and strategies for management of each resident's sleep disturbances. Nonpharmacologic interventions should always be considered as the first line therapy. As in community-dwelling older adults, sedative-hypnotic medications should be avoided to the extent possible. In general, both pharmacologic and nonpharmacologic strategies should be etiology and diagnosis directed. Medical and psychiatric comorbidities, and poor environmental sleep conditions and care practices within the LTC settings should be considered as etiologies for sleep disturbances and should be addressed before instituting pharmacologic or other treatments. Importantly, any painful conditions that could interfere with sleep should be evaluated and treated. Evidence-based guidelines, such as those for the assessment and management of sleep disorders in older adults, should guide management strategies.^{29,48,49} Box 2 summarizes strategies for management of sleep disturbance in LTC.

Nonpharmacologic Strategies

Bright light—A number of investigators have examined the effect of increased bright light on sleep and circadian rhythms in LTC settings. Delivery of bright white light was most often by seating participants in front of a light box or by substituting bright white lights for standard wall or ceiling lights in selected areas. The intensity and duration of the interventions varied. Findings have been mixed, and a 2009 Cochrane Collaboration metaanalysis of 10 studies that met strict inclusion criteria concluded that there was insufficient evidence to assess the value of light therapy for people with dementia because too few of the studies were of high methodologic quality.⁵⁰ Another review in 2011 by Salami and associates⁵¹ concluded that bright light therapy applied at an intensity of greater than 2500 lux for one-half hour or longer in the morning or all day showed a trend toward improved quality and duration of nocturnal sleep and reduced daytime sleepiness in persons with Alzheimer's dementia. Nine of the 12 studies in the review by Salami and colleagues were conducted in the LTC facilities.⁵¹

Exercise and social activity—Although light is the most powerful synchronizer of the circadian rhythm of sleep and wake, daytime physical and social activities are also time cues for sleep and wake, and may improve sleep through other mechanisms such as elevating mood. Richards and coworkers⁵² conducted a randomized controlled trial on the effect of 1 to 2 hours of daytime individualized social activity timed to reduce excessive daytime napping for 21 consecutive days in 147 nursing home residents with dementia. Findings

included significantly fewer minutes of daytime napping and a significantly improved circadian day–night sleep ratio compared with a control group, but nighttime sleep did not improve significantly.⁵²

Two other studies, both using polysomnography to measure sleep outcomes, showed that rather intensive combined exercise and social activity interventions over several weeks improved sleep and other functional and cognitive outcomes in LTC residents. In a randomized, controlled trial in 165 nursing home and assisted living facility residents, Richards and colleagues⁵³ found that those in an exercise plus social activity intervention group had significantly more total sleep time and non–rapid eye movement sleep compared with control groups. The exercise plus social activity intervention consisted of about 45 minutes of high-intensity strength training (3 days a week) and walking (2 days a week) and 1 hour of social activity 5 days a week for 7 weeks. The exercise plus social activity intervention resulted in both statistically and clinically significant increases in sleep compared with the control group. The exercise plus social activity group also had significant improvements in everyday function compared with the control groups.⁵⁴ In another study, 19 residents of a continued care retirement center had increased slow-wave sleep and improvement in memory-oriented tasks compared with a control group after structured social and physical activity for a total of 3 hours a day for 2 weeks.⁵⁵

Multicomponent interventions—A few investigators have measured actigraphy sleep outcomes in clinical trials of multicomponent interventions, most often incorporating reduced time in bed during the day, increased sunlight or light exposure, increased physical activity, consistent bedtime routines, and efforts to decrease nighttime noise, light, and interruptions. The effects on increasing nighttime sleep have been absent or modest; however, there is evidence that circadian rhythm metrics may improve. Alessi and colleagues⁵⁶ found a significant but modest decrease in duration of nighttime awakenings and reduced daytime napping compared with controls, but no other improvements in nighttime sleep after a 5-day intervention in 118 nursing home residents. In a subsequent analysis of the data gathered by Alessi and colleagues, Martin and colleagues⁵⁷ found an improved rest–activity rhythm with a greater active phase in the multicomponent intervention group compared with the control group. In another study in 173 nursing home residents, Ouslander and colleagues⁵⁸ found no differences in sleep measured by actigraphy (or polysomnography in a subsample) between a control condition and a multicomponent intervention that lasted for 17 consecutive day.

Continuous positive airway pressure and other treatments for obstructive sleep apnea—Continuous positive airway pressure (CPAP) is the recommended first-line therapy for the treatment of OSA. Pressurized air through a nasal mask is titrated to reduce the number of events per hour (ie, the apnea–hypopnea index [AHI]) to less than 5, which also decreases sleep fragmentation and oxygen desaturations. A randomized, double-blind, placebo-controlled trial of CPAP versus sham CPAP in community-living persons (n 542) with Alzheimer’s disease and moderate to severe OSA (AHI of 29.8 ± 16.1) showed CPAP adherence levels similar individuals without dementia, and significant pre–post test improvements in the Hopkins Verbal Learning Test and the Trail Making Part B test in those

who received CPAP for 6 weeks.⁵⁹ In a secondary analysis of the data gathered by Richards and colleagues, combined high-intensity strength training and walking exercise significantly reduced the AHI compared with the control group (adjusted mean baseline 20.2 ± 1.39 vs postintervention 16.7 ± 0.96). The mechanism for the improved AHI may be strengthening of inspiratory muscles.⁶⁰ Future studies should focus on the cognitive and functional benefits from treating OSA in the LTC population.

Pharmacologic Strategies

Benzodiazepines (BZDs) are the most frequently used symptomatic treatment for sleep concerns in the older population, including in the LTC setting. However, owing to the unproven long-term effectiveness of BZDs on sleep quality in LTC residents,⁶¹ and the concerns of their adverse effects including acceleration of cognitive impairment⁶² and increased risk of falls, the long-term use of BZDs is discouraged in this population. A recent study reported similar shifting patterns of sedative prescription in older adults over time in community and LTC settings.⁶³ Although BZDs prescription continues to decrease, there is a parallel increase in low-dose, off-label use of other medications with sedative properties such as trazodone and quetiapine, and a high rate of psychotropic polypharmacy.⁶³ More evidence is needed to support this practice. A systematic review of pharmacologic treatments of sleep disturbances in persons with Alzheimer's disease highlighted a lack of evidence and a need for more trials.⁶⁴ Trazadone (50 mg) has some evidence for improving sleep, but the balance between the risks and benefits remains uncertain. Pharmacologic strategies for managing insomnia may be associated with significant side effects and adverse consequences, and should be avoided, or used only when absolutely necessary on a short-term basis. Any pharmacologic treatment should be regularly reviewed.⁶⁵

Complementary and Alternative Treatments

The benefits of complementary and alternative medicine treatments, including dietary supplements, massage, and acupressure, on sleep in LTC residents remain unproven. Additional research is needed in the LTC setting with rigorous study design, large sample size, and both objective and subjective measures for sleep.

Dietary and herbal supplements—Dietary or herbal supplements carry no approval from the US Food and Drug Administration, nor does their production undergo the scrutiny of monitoring by the US Food and Drug Administration. Valerian and melatonin are the most commonly studied supplements for sleep disorders, but quality studies are limited and often offer conflicting results.⁶⁶ The potential drug interactions when using supplements remains unclear and may pose risks to LTC residents.^{66,67} The prolonged use of valerian has not been well-studied and there is no documentation of extended use in the elderly population.⁶⁶ In a multicenter study from 157 individuals with Alzheimer's disease, the use of melatonin did not improve objective sleep measures, although caregivers reported subjective improvements of sleep quality.⁶⁸ Safety concerns exist when using melatonin, especially in the elderly, including the potential for residual daytime sedation and prolonged duration of action. When choosing a melatonin supplement for use in older adults, it is recommended that immediate-release formulations be used, with a maximum of 1 to 2 mg administered 1 hour before bedtime.⁶⁹

Massage and acupressure—Research on alternative therapies such as massage and acupressure is sparse. Acupressure has been shown to improve insomnia in LTC residents.⁷⁰ A recent review concluded that massage offers a practical activity that could be used to enhance sleep and well-being for older adults in residential care.⁷¹ Positive effects of massage on sleep in LTC residents were demonstrated through improvement in sleep diaries,⁷² polysomnography,⁷² nursing observations,⁷³ and fewer requests for sedative-hypnotic medication.⁷⁴ However, massage did not reduce daytime sleepiness measured by the Epworth sleepiness scale in a group of adults with complex care needs living in residential care.⁷⁵

IMPLICATIONS FOR RESEARCH AND PRACTICE

Implications for Future Research

More evidence is needed to support the safety and effectiveness of sleep promotion strategies in the LTC care setting. Priorities for future research included testing the efficacy and effectiveness of environmental changes, physical and social activities, and complementary and alternative medicine methods in LTC residents, in studies with high methodologic quality, large sample sizes, and both objective and subjective measurements of sleep and other clinical outcomes. Comprehensive interventions addressing multiple factors that interfere with sleep are likely to be more successful than singular approaches, given that there are multiple causes of poor sleep in LTC residents. Future research should also investigate tailored personalized sleep promotion strategies based on causes of sleep disturbances in individual LTC residents.

Recommendations for Practice

As an attempt to prevent LTC placement, clinicians should assess sleep on a regular basis and closely monitor older adults with disturbed sleep. Education programs for clinicians are needed to develop an awareness of the importance of sleep, and become skilled in sleep assessment and sleep promotion within LTC care settings. As the essential first step to addressing sleep disturbances, sleep should be routinely assessed among LTC residents and considered an important part of care planning. The characteristics and causes of the sleep disturbance must be investigated carefully. Referral for polysomnography or other diagnostic measure is indicated if a primary sleep disorder is suspected. Sleep promotion is a collaborative effort involving LTC residents and their families and care providers. The sleep promotion strategies should be etiology and diagnosis directed, and should not solely depend on pharmacologic treatments.

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KEY POINTS

- Long-term care (LTC) involves a range of support and services for people with chronic illness and disabilities who can not perform activities of daily living independently.
- Poor sleep increases the risk of LTC placement, and sleep disturbance is extremely common among LTC residents.
- The identification and management of sleep disturbance in LTC residents is a vital, but perhaps underappreciated, aspect of offering high-quality care for this already compromised population.
- This review describes the nature and consequences of sleep disturbances in LTC, clinical assessment and management of sleep disturbances in LTC, and implications for future research and clinical practice.

Box 1**Factors that contribute to sleep disturbance in long-term care****Age-related factors**

- Changes in sleep architecture
- Advanced sleep phase
- Weakening of circadian entertainment
- Visual impairment

Environmental factors

- Daytime limited exposure to bright light
- Nighttime environmental noise, light, and unpleasant temperature
- Room sharing
- Nocturnal care activities and facility routines

Behavioral factors

- Reduced daytime physical activity
- Reduced social activities and social disengagement
- Excessive daytime napping

Medical and psychiatric factors

- Incontinence and nocturia
- Symptoms such as pain and dyspnea
- Dementia or cognitive impairment
- Depression
- Sleep disorders such as insomnia, obstructive sleep apnea, and restless legs syndrome
- Side effects of medications

Box 2**Strategies for management of sleep disturbance in long-term care****Summary and management goals**

- Set goals and develop strategies in collaboration with residents, families, and long-term care staff
- Base strategies on etiology, diagnosis, and evidence-based guidelines for sleep disturbances in older adults
- Consider nonpharmacologic interventions first
- Avoid sedative–hypnotic medications

Nonpharmacologic strategies

- Bright light – 2500 Lux or greater for 30 minutes in the morning or all day
- Exercise and social activity – 1 to 3 hours of daily social activity; strength training and walking 3 to 5 days each week
- Multicomponent interventions – reduced time in bed during day, increased sunlight or light exposure, increased physical activity, consistent bedtime routines, efforts to decrease nighttime noise, light, and interruptions for care
- Continuous positive airway pressure and other evidence-based treatments for obstructive sleep apnea

Pharmacologic strategies

- Evidence is needed on risks and benefits

Complementary and alternative treatments

- Dietary and herbal supplements – safety concerns in older adults; when choosing a melatonin supplement, using immediate-release formulations with a maximum of 1 to 2 mg 1 hour before bedtime
- Massage and Acupressure – may be used to enhance sleep; evidence is needed on types and duration