

Sleep in the Older Adult: Implications for Nurses (CE)

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ormal aging is accompanied by sleep pattern changes that may result in daytime sleepiness and affect the quality of life in older adults. These changes also can signal more serious sleep problems, which become more prevalent with aging. More than half of adults older than 65 living at home and about two-thirds of those in long-term care facilities have some difficulties with sleep. It is important for nurses to understand the normal changes in sleep that accompany aging and be able to differentiate them from the symptoms of serious sleep disorders to ensure holistic care for older adults. (Geriatr Nurs 2003;24:210-4)

To maintain an optimal quality of life, older adults must experience quality sleep that restores both body and mind. Yet changes in the character of sleep that occur with aging alter usual sleep patterns, can result in daytime sleepiness that interferes with daily activities, and may signal a sleep disorder that could profoundly affect a person's ability to function. To provide effective care, health care providers must understand sleep pattern changes that are a part of normal aging and distinguish them from changes that occur with advancing or symptomatic illness and those that reflect serious sleep disorders.

EXTENT OF THE PROBLEM

Sleep disturbances are common in older adults. More than half of adults older than 65 living at home and about two-thirds of those in long-term care facilities are thought to experience some difficulties in their sleep.¹ These sleep difficulties become more prevalent and increase in severity with age. The picture is similar in acute care settings. Self-reported sleep disturbance among hospitalized patients, many of whom are elderly, can range from 22% to 61%.²

Sleep loss can have serious consequences for elders, often contributing to daytime impairments in attention and in the capacity to plan and make decisions. In addition to cognitive difficulties, sleep deprivation also can result in increased anxiety levels and disturbances in memory and may contribute to disordered immune function.² Poor sleep not only reduces quality of life but also may lead to more adverse outcomes. Seriously compromised total sleep time can predispose the elder to depression, and daytime sleepiness has been found to be a risk or precipitating factor in the development of cardiovascular disease and has been associated with higher rates of mortality.³

Yet sleep problems often go unrecognized by health care providers because their recognition depends in large part on self-report, and older adults may accept changes in sleep patterns as a part of normal aging or be reluctant to report them to a provider unless they perceive resulting symptoms as severe.

To intervene effectively, health care providers must understand the extent and nature of sleep problems in elders. Knowledge of normal sleep characteristics, age-related changes in sleep, symptoms of sleep disorders, and the evidenced-based interventions that promote sleep is essential. With this understanding, providers can advise older adults on normal age-related changes in sleep, reassure and educate them to have realistic expectations about their sleep

patterns, teach them how to improve existing sleep habits, and recognize symptoms when sleep disorders exist.

SLEEP CHARACTERISTICS

Understanding the physiology of sleep is necessary to understand age-related sleep changes. The two distinct components in the normal sleep cycle, nonrapid eye movement (NREM) sleep and rapid eye movement (REM) sleep, have unique characteristics. NREM sleep is made up of 4 stages, beginning with Stage 1, the transitional period of drifting to sleep when one can be aroused easily. Stage 2, a period of greater relaxation and light sleep, follows. Stages 3 and 4 are progressively deeper and more restorative periods of sleep when decreases in pulse, blood pressure, and metabolism occur.

REM sleep, a time when the body reaches the deepest level of relaxation, follows the 4 stages of NREM sleep. REM sleep sometimes is called paradoxical sleep because electroencephalographic activity is similar to the pattern seen during wakefulness. Respiratory rate, heart rate, and blood pressure become highly variable, irregular, and frequently elevated (but profound muscle relaxation occurs). REM sleep is characterized by a preponderance of vivid dream activity. Our large muscle immobility keeps us from acting out our dreams.

A typical sleep cycle consists of NREM 1 followed by NREM 2, 3, and 4 with possible drifting back through previous stages of NREM 3 and 2 before the REM stage starts. REM sleep is followed by more Stage 2 NREM. The cycle, usually about 90 minutes long, repeats itself throughout a full night's sleep. Awakenings in the middle of the night alter the normal progression of sleep with a return to Stage 1 NREM and disrupt the normal sleep cycle.

A number of mechanisms regulate sleep. Chief among them is the circadian drive for sleep and wakefulness. An intrinsic body clock residing in the suprachiasmatic nucleus within the hypothalamus regulates a complex series of rhythms in humans, including the circadian drive for sleep

Instructions to CE enrollees:

The closed-book, multiple-choice examination that follows this article is designed to test your understanding of the educational objectives listed below. The answer form is on page 216.

Objectives:

1. Describe normal changes in sleep patterns
2. Identify sleep disorders in the older adult
3. Discuss implications for nursing

Common Sleep Complaints Needing Further Assessment

Difficulty falling asleep
Early morning awakenings
Excessive daytime sleepiness
Frequent awakenings
Nonrefreshing sleep

and wakefulness, and is synchronized with the light-dark environmental rhythm. Refreshing sleep is in synchrony with the person's circadian rhythm. When the circadian clock and the environmental cycle are misaligned, as in jet lag or shift work, sleep disorders may result.

Melatonin, produced by the pineal gland during the dark hours, is equally important in maintaining a normal sleep cycle. Often called the hormone of darkness, melatonin has a role in sleep induction because it is released in response to changes in light and inhibits the major neurotransmitters involved in arousal: histamine, norepinephrine, dopamine, and serotonin.

The sleep-wake cycle also is synchronized with other biologic rhythms: body temperature fluctuations and the release of cortisol and growth hormone. Temperature changes correlate with the onset of sleep, the periods of deepest sleep, and the tendency to awaken. The release of cortisol and growth hormone also vary in a circadian pattern according to sleep cycle phases. Because biologic rhythms are synchronized, a disturbance in the normal sleep cycle can affect the neuroendocrine and immune systems.

NORMAL CHANGES WITH AGING

Several changes occur in the nature of sleep that accompanies aging. The need for sleep remains about the same, but the character of sleep changes. Older adults experience lighter, more interrupted sleep. They spend more time in Stage 1 than younger adults and also experience a decrease in Stages 3 and 4, the periods of deep, most restorative sleep. The amount of time in REM sleep stays about the same but occurs earlier in the sleep cycle.

The amplitude of the circadian rhythm declines with age because of diminished body temperature and melatonin production rhythms. Older adults also tend to wake up at a time closer to their body temperature minimum, which seems to be phase-advanced, especially in elderly women who go to bed earlier and wake up earlier. Much of the insomnia resulting from early morning awakenings reflects circadian effects.⁴

Although the age-related physiologic changes that affect the elder's sleep lead to more fragile, easily inter-

rupted sleep, these changes usually do not interfere with the quality of sleep. Changes in sleep architecture may become problematic, however, in the context of illness (both medical and psychiatric) predisposing the older adult to develop insomnia. Heart and respiratory disease, stroke, diabetes, chronic pain, benign prostatic hyperplasia, and depression have been shown to adversely affect sleep, either as a direct result or because of medications used in treatment. Patients who have Alzheimer and Parkinson's diseases also experience difficulty sleeping. In fact, when older persons with poor sleep accompanying physical illness, medication use, or psychiatric history are screened, older adults have a much lower incidence of sleep complaints, perhaps as few as 3%.⁵

DISTURBANCES IN SLEEP

Among those who do have sleep problems, insomnia is the most common complaint. Patients who report a problem usually experience one or more of the following: difficulty falling asleep (sleep latency), difficulty staying asleep (sleep efficiency), early morning awakening, or not feeling refreshed after sleeping.⁶ Insomnia can be both a symptom and a sleep disorder. Although physical discomfort and worries are two main reasons given for insomnia, providers must recognize that insomnia can become chronic if not treated early.

Providers also should recognize the possible predictive value of sleep changes in relation to physical and mental health problems. Mental health problems are more often associated with insomnia than physical ones.⁷ Difficulty sleeping, for example, is sometimes the reason patients having anxiety disorders or major depression that has not previously been identified initially seek treatment. Depression even may be prevented in some cases by early treatment of sleep disturbance.⁶

In addition to insomnia, older adults experience other sleep disorders that disturb normal sleep patterns and consequently affect quality of life. Sleep-disordered breathing is the most common among them. Studies have demonstrated that nearly 25% of all elders incur some form of disturbed breathing during sleep, with obstructive sleep apnea (OSA) being the most common disorder.¹

The development of OSA seems to be age-dependent and slightly male dominant. Although OSA is related also to obesity and body weight is as strong a predictor as chronologic age, diabetics also may have an increased incidence of the disorder.^{1,6} Growing evidence indicates patients with OSA have an increased risk of having cardiovascular complications, such as hypertension, left ventricular diastolic dysfunction, arrhythmia, myocardial infarction, pulmonary hypertension, and stroke.⁸

Persons with sleep apnea usually snore very loudly and stop breathing for 10 to 30 seconds repeatedly during sleep. Because they wake up every time breathing stops, their normal sleep cycle is interrupted and results in daytime sleepiness. A collapsing upper airway causes the

apnea. The mainstay of treatment is to keep the airway open using a continuous positive airway pressure device while sleeping. In some cases surgical intervention is required, but clinicians usually recommend weight loss first.⁹

Two other sleep disorders that profoundly affect sleep in the elderly are periodic limb movement disorder (PLMD) and restless legs syndrome (RLS). PLMD is characterized by episodes of repetitive limb movements caused by muscle contractions during sleep. It causes people to kick or jerk their legs every 20 to 40 seconds throughout the sleep episodes. The movements usually occur when the person is in non-REM Stage 1 or Stage 2. Those who have this problem may neither awaken nor have symptoms other than complaints of daytime fatigue. Many PLMD cases may go undetected if a sleep partner does not notice the unusual leg movements.¹⁰

With RLS, patients have uncomfortable sensations in the lower extremities. These feelings are described as crawling or pulling in the legs, especially the calves, when lying down, and the person experiencing them typically tries to relieve symptoms by moving the legs and may want to get up and walk about. Although RLS is the more frequent diagnosis, approximately 18.5% of those with RLS also have PLMD.¹⁰

In clinical studies, both disorders most often are associated with either a mental or a physical disease, such as diabetes, arthritic diseases, musculoskeletal diseases, cardiovascular diseases, anemia, renal failure, OSA, and affective disorders.¹⁰ A genetic factor may be present in RLS: up to half the persons with the condition have a family history of it. Treatment focuses on resolving any underlying cause of the disorder using cognitive-behavioral and sleep hygiene therapies and, if necessary, drug therapy. For RLS, such over the counter (OTC) medications as acetaminophen or a nonsteroidal anti-inflammatory drug can be tried first. In severe cases, a dopamine agonist ordinarily used in the treatment of Parkinson's disease may be effective.¹

SLEEP PROMOTION

In addressing sleep disturbance in the elderly, assessment forms the cornerstone of care. It is important that nurses working with older adults ask about sleep and recognize when responses indicate a potential problem. Reports of difficulty falling asleep, awakening earlier or later than desired, frequent nighttime awakenings, and not feeling well rested point to a need for additional information. Changes in behavior, performance, and cognition (eg, increasing irritability, restlessness, lethargy, listlessness, memory, and problem-solving difficulties) and physical signs of sleep deprivation (eg, frequent yawning, dark circles under eyes, and slowed response time) may indicate sleep problems and warrant further assessment.

Nurses also should ask about any existing health problems and related medication use, including OTC products and alcohol. Elders may self-medicate with OTC products

Sleep Diary Characteristics

- Alcohol intake
- Caffeine intake
- Daytime alertness
- Food amounts, types, and scheduling
- Number and timing of naps
- Number of and reason for nighttime awakenings
- Quality of sleep
- Schedule of bedtime and awakening
- Use of medications
- Use of bedtime routine

containing antihistamines or use alcohol as a soporific. Alcohol may induce sleep initially, but it also makes sleep more difficult to maintain. Nurses should also ensure that patients understand how illness, medications, and poor sleep can be related, and verify that patients with sleep problems associated with illness receive care.

Evidence-based nursing interventions address insomnia and encompass educating patients, facilitating behavioral changes, altering the environment to make it more conducive to sleep, and planning care that both relaxes the sleeper and preserves normal circadian rhythms. Patient education is among the first-line interventions nurses can use in helping patients understand the nature of a sleep disturbance. These include teaching patients how to recognize age-related changes in sleep and how to keep a sleep diary to provide additional information about factors affecting sleep and therapeutic response to treatment strategies.

Effective behavioral strategies to promote sleep include encouraging a bedtime routine with a consistent retiring and arising time. Elders with a routine, such as watching television or reading before going to bed, report fewer sleep complaints than those without one. The patient also should be advised to avoid heavy meals or spicy food, caffeine, and smoking or other tobacco use before bedtime. Regular exercise also can improve sleep quality. Daytime exercise slightly increases the amount of Stage 3 and Stage 4 sleep, possibly by bringing about elevations in daytime core body temperature. Exposure to sunlight improves the average time elders remain asleep because bright light increases the production of melatonin.¹¹

Using relaxation techniques to promote sleep also has considerable research support. Difficulty falling asleep may result from anxiety, pain, muscular and joint discomfort, or psychologic stress associated with illness. Teaching patients how to do progressive relaxation (learning to tense and relax muscles systematically from head to toe) has been found to be effective by enabling them to decrease the

time to sleep onset and the number of nighttime awakenings and to sleep more soundly. Listening to relaxing music and using guided imagery (usually done with the help of a tape of ocean sounds, rain, waterfalls or other relaxing auditory sounds) can also promote sleep. Additional research on the effectiveness of these interventions will improve their usefulness in evidence-based nursing.¹²

Sleep difficulties in older adults often worsen, and for this group the nurse can create an environment more conducive to sleep by decreasing environmental stimuli, particularly noise, which has been shown to be a major hindrance to sleep. Noise not only disrupts rest and sleep but also increases stress response so that patients become more alert and vigilant when sleep is needed. Strategies include closing the patient's door, placing phones on low volume, speaking at lower volumes, and dimming the lights—an intervention found to work because it causes people to lower their voices. Interestingly, noise from staff has been found to be the most significant disturbance. Nurses also can avoid disrupting sleep by clustering patient care activities to allow sufficient time for sleep, especially in intensive care areas. Providing at least a 6-hour uninterrupted period can result in self-reported sleep improvement.²

PHARMACOLOGIC INTERVENTIONS

Sedative/hypnotic drugs are used widely to treat insomnia in older adults. Up to 40% of sleeping pill prescriptions go to the elderly, even though age-related physiological changes in body composition and drug metabolism increase the risk for the accumulation and toxicity of sedative/hypnotics in older patients. Among the most serious adverse effects associated with these drugs are delirium, falls, and respiratory depression, but older adults also may have daytime sedation, dependency, slowed reaction time, impaired memory, rebound insomnia, and chronic sleep disorders.

Pharmacotherapy longer than a few weeks should be avoided because of its detrimental effects in elders. Cognitive-behavioral and educational approaches are more effective in helping older adults resume normal sleep patterns and reduce their use of medication. Short-term medication use that carefully considers pharmacokinetics and pharmacodynamics specific to older adults, the type of sleep disturbance patients experience, and the properties of the selected drug can help them cope with insomnia as they await the benefits from nonpharmacologic interventions.^{6,13}

Currently under investigation is the use of melatonin, available as an OTC dietary supplement, to treat insomnia, jet lag, and sleep problems in shift workers. Preliminary findings suggest that melatonin is useful in treating sleep disturbance in elderly patients by augmenting their natural but diminished production of this hormone. In studies that compared exogenous melatonin use with placebo, groups receiving melatonin fell asleep more quickly, had a better quality and duration of sleep, and maintained alertness the next day.

Although melatonin holds promise, its routine use is not

recommended. In one study patients taking both melatonin and nifedipine were found to have poorer blood pressure control than the control group, yet no relevant adverse effects were found in other reviews concerning melatonin in elders.¹³ Also, like herbal preparations, melatonin is a nutritional supplement with variable formulations at particular dosages. Questions regarding the therapeutic use of melatonin, such as optimal dosage, long-term effects, and drug interactions, still require further investigation.

CONCLUSION

The importance of healthy sleep in older adults cannot be overestimated. Nurses have a key role in understanding the consequences of poor sleep on quality of life; recognizing the relationships among sleep complaints, sleep disorders, and serious illness; and promoting optimal sleep among elders with no sleep problems and those with sleep disturbances. Nurses often are the providers who make decisions to administer sleeping pills to elderly patients or to try nonpharmacologic interventions. Educational programs for nursing staff that offer information about sleep and sleep-promoting interventions are critical in ensuring practice patterns that address sleep problems and promote positive sleep outcomes. Interestingly, one of the most important factors found to determine the number of sleep-promoting interventions nurses implement is the nurse's personal belief that sleep is a priority for the patient.¹⁴

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0197-4572/2003 \$30.00 + 0
doi:10.1067/mgn.2003.64

1. Sleep deprivation can result in the following EXCEPT:
 - A. Increased daytime alertness
 - B. Increased anxiety levels
 - C. Immune system disorders
 - D. Cognitive difficulties
2. In which stage of sleep is there a decrease in pulse, blood pressure, and metabolism?
 - A. Stage 1
 - B. Stage 2
 - C. Stages 3 or 4
 - D. REM
3. In which stage of sleep does vivid dream activity occur?
 - A. Stage 1
 - B. Stage 2
 - C. Stage 3-4
 - D. REM
4. The “hormone of darkness” is:
 - A. Histamine
 - B. Melatonin
 - C. Norepinephrine
 - D. Dopamine
5. Sleep latency is:
 - A. Difficulty in falling asleep
 - B. Early morning awakening
 - C. Not feeling refreshed
 - D. Difficulty in staying asleep
6. What percentage of elders experience disturbed breathing during sleep?
 - A. 10%
 - B. 25%
 - C. 60%
 - D. 85%
7. The development of obstructive sleep apnea (OSA) is related to the following EXCEPT:
 - A. Obesity
 - B. Diabetes
 - C. Chronologic age
 - D. Exercise
8. Patients with OSA have an increased risk of the following EXCEPT:
 - A. Myocardial infarction
 - B. Pulmonary hypertension
 - C. High HDL cholesterol
 - D. Stroke
9. Periodic limb movement disorder (PLMD) is:
 - A. Crawling in the legs relieved only by movement
 - B. Repetitive muscle contractions during stage 1-2 sleep
 - C. Pulling in the calf muscles
 - D. Seizure-like tonic-clonic movements
10. What percentage of patients with repetitive leg syndrome (RLS) also have PLMD?
 - A. 3%
 - B. 11.5%
 - C. 15%
 - D. 18.5%
11. Both RLS and PLMD most often are associated with any of the following EXCEPT:
 - A. Arthritis
 - B. Cardiovascular disease
 - C. Renal failure
 - D. Physical exhaustion
12. Signs that may trigger sleep disturbance assessment questions include the following EXCEPT:
 - A. Restlessness
 - B. Lethargy
 - C. Urticaria
 - D. Listlessness

CE ANSWER/ENROLLMENT FORM

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