Managing Sleep Deprivation in Older Adults: A Role for Occupational Therapy

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ABSTRACT
About 40% to 70% of older adults have problems sleeping, which can result in social isolation, decline in function, increased risk of falling, impaired cognitive function, and increased morbidity and mortality (Leland et al., 2014). Sleep and rest are recognized as core occupations in the Occupational Therapy Practice Framework: Domain and Process (3rd ed.; American Occupational Therapy Association, 2014). Many occupational therapy clients with specific physical or mental illnesses or living certain lifestyles are at risk of a sleep disorder that threatens their health and quality of life. Occupational therapy practitioners are well positioned to provide insights into how illness, environments, habits, routines, and psychosocial factors can affect sleep.

The purpose of this article is to identify the occupational contexts of sleep, describe the effects of sleep deprivation on occupational performance and participation, provide information about evaluating sleep using standardized and non-standardized assessments, and describe specific intervention strategies to address sleep. Although this article focuses on occupational therapy management in the context of the older adult population, much of the information discussed is useful for clients throughout the life span.

LEARNING OBJECTIVES
After reading this article, you should be able to:
1. Identify the various client factors, performance patterns, contexts, and environments that contribute to sleep deprivation
2. Describe the effects of sleep deprivation on occupation and participation
3. Discuss the evaluation process and interventions to address sleep deprivation
4. Articulate occupational therapy’s distinct role in treating sleep deprivation

Human beings spend one third of their lives asleep. Once thought of as a period of simple response enforced by limited daylight, sleep is in fact a complex, dynamic state critical to growth and development (Solet, 2014). Approximately 50 million to 70 million U.S. adults have a sleep or wakefulness disorder, such as sleep apnea, pain syndromes, parasomnias, and insomnia (Institute of Medicine, 2006). Recognizing the gravity of the situation, the Centers for Disease Control and Prevention (2018) has recognized insufficient sleep as a public health epidemic.

Sleep in older adults: 40% to 70% of older adults have problems sleeping, which can result in social isolation, decline in physical function, increased risk of falling, impaired cognitive function, and increased morbidity and mortality (Leland et al., 2014). A study by Leland and colleagues (2014) found that poor sleep is associated with greater health care services use, with annual health care costs being $1,143 higher for older adults with insomnia compared with those without it. These poor outcomes underscore the growing need for health professionals to address inadequate sleep among older adults (Leland et al., 2014).

Sleep as an occupation: In 2002, the American Occupational Therapy Association (AOTA) classified sleep as an activity of daily living in the first edition of the Occupational Therapy Practice Framework (Framework). In 2008, rest and sleep were reclassified as their own occupational domain in the Framework's second edition. This shift in focus acknowledged the significant effect rest and sleep have on participation in daily occupations (Gentry & Loveland, 2013). The current edition of the Framework defines rest and sleep as “activities related to obtaining restorative rest and sleep to support healthy, active engagement in other occupations” (AOTA, 2014, p. S20) and includes the categories of rest, sleep preparation, and sleep participation.
Sleep preparation is an individual’s routine that helps to prime their body and mind to rest. It is defined as:

1. Engaging in routines that prepare the self for a comfortable rest, such as grooming and undressing, reading or listening to music to fall asleep, saying goodnight to others, and engaging in meditation or prayers; determining the time of day and length of time desired for sleeping and the time needed to wake; and establishing sleep patterns that support growth and health (patterns are often personally and culturally determined).
2. Preparing the physical environment for periods of unconsciousness, such as making the bed or space on which to sleep; ensuring warmth or coolness and protection; setting an alarm clock; securing the home, such as locking doors or closing windows or curtains; and turning off electronics or lights. (AOTA, 2014, p. S20)

Sleep participation is defined by the Framework as:

Taking care of personal needs for sleep, such as ceasing activities to ensure onset of sleep, napping, and dreaming; sustaining a sleep state without disruption; and performing nighttime care of toileting needs and hydration; also includes negotiating the needs and requirements of and interacting with others within the social environment, such as children or partners, including providing nighttime caregiving such as breastfeeding and monitoring the comfort and safety of others who are sleeping. (AOTA, 2014, p. S20)

Sleep deprivation is a public health issue having significant biological, physiological, and psychosocial implication for older adults’ health and quality of life (AOTA, 2017). Occupational therapy practitioners are well positioned to understand how illness, environment, habits, routines, and several psychosocial factors affect sleep. Still, sleep is an occupation that is largely understudied in occupational science (Boswell et al., 2015). The purpose of this article is to discuss sleep deprivation in older adults, describe occupation-based assessments and interventions that fall within the scope of occupational therapy practice, and provide suggestions for future directions in occupational therapy research and practice.

**PHYSIOLOGY OF SLEEP**

Sleep is defined as a recurring, reversible neuro-behavioral state of relative perceptual disengagement from, and unresponsiveness to, the environment. In humans, sleep is typically accompanied by “postural recumbency, behavioral quiescence, [and] closed eyes” (Carskadon & Dement 2005, p. 16). Table 1 shows the recommended hours of sleep for age groups from birth to mature adulthood. It is to be noted that adults over 65 years should get 7 to 8 hours of sleep per night.

**Sleep architecture, types, and phases:** Sleep occurs in a pattern that is phased and rhythmic. This pattern is called sleep architecture (Pierce & Summers, 2011). While sleeping, the activity of the brain alters in characteristic ways over the course of the night. These patterns have been classified into two main types of sleep: rapid-eye-movement (REM) sleep and non-rapid-eye-movement (NREM) sleep. NREM sleep is further broken down into three distinct stages: N1, N2, and N3. N1 is very light sleep; N2 is slightly deeper; and N3, also called slow-wave sleep, is the deepest NREM sleep stage (Boswell et al., 2015).

**Sleep in older adults:** When an adult reaches the senior years, sleep patterns continue to change. There is more light-stage N1 sleep and less deep-stage N3 sleep (Bilwise, 1997). Some pathophysiologic conditions further exacerbate their sleep issues. These conditions include periodic leg movements, nocturia, diabetes, cardiovascular disease, gastrointestinal issues, chronic pain, nocturnal cough, and disordered breathing (Pierce & Summers, 2011). Thus, it is no surprise that difficulty maintaining healthy sleep through the night is prevalent in the elderly.

**Why is sleep important for older adults?** A good night’s sleep is especially important for older adults because it helps to improve concentration and memory formation, allows their bodies to repair cell damage that occurred during the day, and refreshes their immune systems, which in turn helps to prevent disease (Smith et al., 2018). Older adults who do not sleep well are more likely to have depression, difficulties maintaining attention, memory problems, and excessive daytime sleepiness, and they experience more nighttime falls (Smith et al., 2018).

**EFFECTS OF SLEEP DEPRIVATION**

Sleep deprivation is defined as not obtaining adequate total sleep (American Sleep Association, 2018). When someone is in a chronic sleep-deprived state, they will often experience excessive daytime sleepiness, fatigue, clumsiness, and abnormal weight gain or weight loss. In addition, sleep deprivation affects both the brain and the cognitive functions of an individual (American Sleep Association, 2018). Sleep deprivation has serious health effects, both in the short and long term. For more on this, see Table 2 on page CE-3.

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**Table 1. Recommended Daily Hours of Sleep Throughout the Life Span** (American Sleep Association, 2018)

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommended Hours of Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn (0–2 months)</td>
<td>12–18</td>
</tr>
<tr>
<td>Infant (3–11 months)</td>
<td>14–15</td>
</tr>
<tr>
<td>Toddler (1–3 years)</td>
<td>12–14</td>
</tr>
<tr>
<td>Preschooler (3–5 years)</td>
<td>11–13</td>
</tr>
<tr>
<td>School–age children (5–10 years)</td>
<td>10–11</td>
</tr>
<tr>
<td>Teen (10–17 years)</td>
<td>8.5–9.25</td>
</tr>
<tr>
<td>Adult (18–64 years)</td>
<td>7–9</td>
</tr>
<tr>
<td>Older adult (65+)</td>
<td>7–8</td>
</tr>
</tbody>
</table>
CAUSES OF SLEEP DEPRIVATION

Sleep deprivation may be a primary but is more often a secondary disorder stemming from another health condition. It can also be triggered by medications, and in some cases, caused by sleeping habits or the environment.

The most common causes are:
- Stress and anxiety (Bilwise, 1997): Work-related pressures, death of a loved one, or other significant life changes that cause worry and distraction may affect sleep.
- Poor sleep hygiene: Behaviors, pre-sleep habits, or the bed or surrounding environment may not be optimal for sleep.
- Irregular sleep schedule (Smith et al., 2018): Travel, jetlag, daytime napping, inconsistent sleep and wake times, erratic work hours, and other factors can throw off the body’s internal clock, which is responsible for telling the body when to sleep and wake.
- Consumption of stimulants (Smith et al., 2018): Coffee, nicotine, or other stimulants consumed close to bedtime may cause delay in sleep.
- Consumption of alcohol (Bilwise, 1997): Alcohol has a sedating effect, initially promoting sleep but later inhibiting the REM stage, resulting in fragmented sleep.
- Polypharmacy (Bilwise, 1997): Taking several medications can create side effects and a greater chance for drug interactions. Prescription medication for depression, hypertension, asthma, and some pain medications; allergy and cold medications; and weight loss products can cause sleep deprivation.
- Depression (Bilwise, 1997): Depression is more common in the elderly population, and insomnia is often a symptom. (Conversely, insomnia may also cause depression.)
- Pain: Arthritis, osteoporosis, and other conditions causing physical pain or discomfort might cause sleeplessness.
- Frequent urination (Bilwise, 1997): Waking up to go to the bathroom throughout the night is another common reason for sleep deprivation.

Table 2. Impact of sleep deprivation (Bilwise, 1997)

<table>
<thead>
<tr>
<th>Short-Term Effects</th>
<th>Long-Term Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>Drowsiness, leading to drowsy driving</td>
<td>Heart attack</td>
</tr>
<tr>
<td>Forgetfulness</td>
<td>Stroke</td>
</tr>
<tr>
<td>Distractibility</td>
<td>Obesity</td>
</tr>
<tr>
<td>Decreased performance and alertness</td>
<td>Type 2 diabetes</td>
</tr>
<tr>
<td>Memory and cognitive impairment</td>
<td>Depression and mood disorder</td>
</tr>
<tr>
<td>Stressed relationship</td>
<td>Poor quality of life</td>
</tr>
<tr>
<td>Automobile accidents</td>
<td></td>
</tr>
</tbody>
</table>

CONTOXNS OF SLEEP

The Framework (AOTA, 2014) defines contexts and environments as various interrelated conditions within and surrounding the client that influence performance, including cultural, physical, personal, temporal, and virtual contexts. All occupations have their corresponding contexts.

The social context of sleep: According to the Framework, the social context is defined as the presence of; relationship with; and expectations of persons, groups, or populations with whom clients have contact. Rosenblatt (2006) conducted a study on couples who share a bed, describing their development of bed-sharing skills, negotiation of a shared bed routine, important activities that occur in bed before sleep, valuation of shared sleep, and effects of illness and sleep disorders on both partners in a bed-sharing couple. Bed partners of persons with sleep apnea, restless leg syndrome, and/or snoring sustain a level of sleep debt that nearly matches that of the person with the symptoms. Thus, the presence of another person in the bed influences sleep routine and quality of sleep (Pierce & Summers, 2011).

The temporal context of sleep: According to the Framework, the temporal context is defined as the experience of time as shaped by engagement in occupations. The temporal context includes stage of life, time of day or year, duration and rhythm of activity, and history. Personal and family routines for sleep support the maintenance of this daily rhythm. Adults with sleep disorders usually have poor sleep routines and have difficulty supporting a regular sleep rhythm. People who work evening and night shifts require especially strong and regular sleep routines to support the adequacy of their sleep.

The physical context of sleep: The physical context of sleep may be the most concrete, as it includes all non-human physical and sensory aspects of the environment (AOTA, 2014). If the sleeping area is too bright, noisy, warm, cold, or dry, sleep may be disrupted. Particularly for persons with allergies or asthma, the sleep space should be allergen-free as possible. Sleepwear should be comfortable and non-restrictive for a sound night’s sleep. It is also important to keep the bedroom peaceful and uncluttered (Pierce & Summers, 2011).
SCREENING, EVALUATION, AND INTERVENTION FOR SLEEP DEPRIVATION

In the domain section of the Framework, sleep is a client factor under the Global Mental Functions category and includes the physiological process of sleep (AOTA, 2014). Sleep is not only a primary occupation in our lives and essential for good health, but it is also a physiological process and body function. Because sleep plays such a major role in everyone’s lives, occupational therapists should inquire about their clients’ sleep in every initial evaluation (Pierce & Summers, 2011).

Obtaining a thorough assessment of the extent and nature of the issues surrounding an individual’s sleep problems is key to finding the ideal interventions. This information can be gathered through informal evaluations, such as asking basic sleep history questions or collecting data through self-report measures, including sleep diaries; or through formal screening tools. Sleep can be objectively measured by conducting polysomnography (in a sleep lab or at home), actigraphy (Actiwatches), and other forms of observation (Green et al., 2015).

Subjective Evaluation of Sleep

It is important to ask the client or their caregivers for their perspectives on how they are sleeping, as sleep difficulties are frequently not reported (and instead considered “normal,” part of the disability, to be expected, or not a priority for the family or client). It often fits well in an initial interview or occupational profile to ask about sleep alongside other questions about daily routines. For instance, some Model of Human Occupation assessments ask about a typical weekday and a typical weekend day where questions about sleep can fit in well (Pierce & Summers, 2011).

Sleep history (Green et al., 2015): Questions regarding the client’s usual sleep pattern should include:
- How sound was their sleep? Did they have an uninterrupted, restful sleep or was the sleep interrupted?
- Quality of sleep: Usual sleep pattern, schedule, hours of sleep, and feeling on waking
- Sleep environment: Description of room, number of people sleeping in the room, temperature, noise level, and light in the room
- Associated factors: Bedtime routine, use of sleep medication or any other sleep inducer
- Opinion of sleep: Adequate, inadequate, or problematic

Questions regarding altered sleep patterns are intended to discover information such as:
- The nature of the problem: Inability to fall asleep, difficulty remaining asleep, inability to fall asleep after awakening
- The quality of the problem: Number of hours of sleep versus number of hours spent trying to sleep, total number of hours of sleep per night, duration and frequency of daytime naps, and number of waking episodes per night
- Environmental factors: Quality of bed or bedding, level of noise, lighting in the bedroom, surrounding stimulation, and sleeping partner’s sleep habits

Table 3. Sleep Diary

<table>
<thead>
<tr>
<th>Complete in the morning</th>
<th>Complete at the end of the day</th>
</tr>
</thead>
<tbody>
<tr>
<td>I went to bed last night at ____ PM/AM</td>
<td>I consumed caffeinated beverages in ____ the morning/afternoon (#) ____ evening (#) ____ N/A</td>
</tr>
<tr>
<td>I got out of bed this morning at ____ PM/AM</td>
<td>Number of alcoholic beverages consumed throughout the day ____</td>
</tr>
<tr>
<td>Last night I fell asleep …</td>
<td>Medications taken during the day ____</td>
</tr>
<tr>
<td>○ Easily</td>
<td>____</td>
</tr>
<tr>
<td>○ After some time</td>
<td>____</td>
</tr>
<tr>
<td>○ With difficulty</td>
<td>____</td>
</tr>
<tr>
<td>Number of times I woke up during the night</td>
<td>Number of times I woke up during the night ____</td>
</tr>
<tr>
<td># of times ____</td>
<td>For # of minutes ____</td>
</tr>
<tr>
<td>Last night I slept for a total of ____ hours</td>
<td>I exercised for at least 20 minutes in the: ____</td>
</tr>
<tr>
<td>My sleep was disturbed by:</td>
<td>Morning</td>
</tr>
<tr>
<td>(List mental or physical factors, including noise, lights, pets, allergies, room temperature, discomfort, stress, etc.)</td>
<td>Afternoon</td>
</tr>
<tr>
<td></td>
<td>Evening</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>When I woke up for the day, I felt:</td>
<td>How likely I was to doze off during the day while performing a daily activity: ____</td>
</tr>
<tr>
<td>○ Refreshed</td>
<td>No chance</td>
</tr>
<tr>
<td>○ Somewhat refreshed</td>
<td>Slight chance</td>
</tr>
<tr>
<td>○ Fatigued</td>
<td>Moderate chance</td>
</tr>
<tr>
<td></td>
<td>High chance</td>
</tr>
<tr>
<td>Took a nap:</td>
<td>Throughout the day, my mood was: ____</td>
</tr>
<tr>
<td>Yes/No</td>
<td>○ Very pleasant</td>
</tr>
<tr>
<td>If yes, how long? ____</td>
<td>○ Pleasant</td>
</tr>
<tr>
<td></td>
<td>○ Unpleasant</td>
</tr>
<tr>
<td></td>
<td>○ Very unpleasant</td>
</tr>
<tr>
<td>Approximately 2 to 3 hours before going to bed, I consumed:</td>
<td>In the hour before going to sleep, my bedtime routine included: ____</td>
</tr>
<tr>
<td>○ Alcohol</td>
<td>(List activities, such as reading a book, using electronics, taking a bath, doing relaxation exercises, etc.)</td>
</tr>
<tr>
<td>○ A very heavy meal</td>
<td></td>
</tr>
<tr>
<td>○ Caffeine</td>
<td></td>
</tr>
<tr>
<td>○ None of these</td>
<td></td>
</tr>
</tbody>
</table>
• Other associated factors: Time and type of the last meal (heavy or light) before bed; activity prior to bed; level of stress, anxiety, and pain; and recent illness or surgery. The effects of fatigue, irritability, and confusion should also be considered while evaluating sleep.

Self-report measures: Various screening tools are used in research and practice that can indicate whether a person has a sleep problem. Some of these tools provide other relevant and useful information about the type of issue, and sometimes about the probable causes. The choice of tool should depend on what needs to be measured, the intended purpose (research or clinical practice), and how much time the client or participant has to complete the tool.

Commonly used standardized sleep assessment tools include:
- Epworth Sleepiness Scale (1997)
- Pittsburgh Sleep Quality Index (Buysse et al., 1989)
- Dysfunctional Beliefs and Attitudes About Sleep (E Provide, 2007)
- Glasgow Sleep Effort Scale (Broomfield & Espie, 2005)

Sleep diaries: Sleep diaries are widely used in research and clinical settings. Information recorded in the diary includes the time an individual went to bed and woke up, the number of hours of sleep, consumption of alcohol or caffeine, the number and duration of naps, and physical activities or exercise during daytime. Individuals are typically asked to record these details every day for 2 weeks (Solet, 2014). Multiple variations of sleep diaries are available. See Table 3 on page CE-4 for an example of a sleep diary.

Occupational profile of sleep: An occupational sleep profile, such as the one shown in Figure 1, can be used in addition to a formal assessment performed at a sleep clinic, or for those who choose not to seek formal assessment. The purpose of the profile is to quantify a client’s sleep routines, patterns, and environment.

The role of the occupational therapist is to gather input from the client, analyze the information, and then make recommendations to improve the client’s sleep (Pierce & Summers, 2011). The occupational profile is a summary of a client’s occupational history and experiences, patterns of daily living, interests, values, and needs (AOTA, 2014). The occupational therapist can include the client’s occupation of sleep in the occupational profile (see Figure 1).

Other client factors occupational therapy practitioners should consider include:
- Caregiving responsibilities
- Work and life events
- Pain and fatigue
- Disturbances in balance, vision acuity, muscle strength, skin integrity, and range of motion in upper and lower extremities
- Sensory integration or processing issues

Figure 1. Occupational Profile of Sleep as Recommended by Pierce and Summers (2011)

**OCCUPATIONAL PROFILE OF SLEEP**

Client: __________________________
Date: __________________________
Client Record #: __________________________
DOB: __________________________
Diagnosis/Respiratory conditions: __________________________
Precautions/Allergies: __________________________
List medications (including herbal supplements)
<table>
<thead>
<tr>
<th>Time</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SLEEP ROUTINE**

What are your concerns about your sleep? __________________________

How long has this occurred? __________________________
How long does it take to fall asleep? __________________________
Time you typically fall asleep: __________________________
What time do you wake up in the am? __________________________
Amount of a typical night’s sleep: __________________________
Do you sleep through the night? __________________________
How often do you wake? __________________________
What is the cause of awakenings, if known? __________________________
How long does it take to fall back asleep? __________________________
Describe how you feel when you wake up (restful, tired): __________________________
Do you take naps—frequency, length, and time of the day? __________________________
Describe sleep pattern on the weekend: __________________________
Do you have increased stress in your life? Describe: __________________________
Is sleep a priority in your life? __________________________

**AWAKE ROUTINE**

Do you participate in other occupations in your bedroom? (work, computer, read, smart phone, television):

Exercise regularly: Yes No Type: __________________________
Time of day: __________________________
What time you do you eat your meals? __________________________
Do you drink caffeinated beverages? Yes No How much? __________________________
Time of day: __________________________
Do you drink alcoholic beverages? Yes No How much? __________________________
Time of day: __________________________
Do you smoke? Yes No How much? __________________________
Are you around smoke on a regular basis? Yes No
Describe your nightly routine, from dinner to bedtime: __________________________

**SLEEP ENVIRONMENT**

Bed size: king, queen, full, or twin
Mattress type and condition: __________________________
Linens type and texture: __________________________
Type of pajamas: __________________________
Temperature: __________________________ Light level: __________________________ Noise level: __________________________
Bed sharers: partner, children, pets, other: __________________________
Describe your sleep environment: __________________________
Additional information: __________________________

**SLEEP PATTERNS**

Do you snore? __________________________
Do you move around in your sleep? __________________________
Do you move your legs, have the urge to move them, or have pain? __________________________
Do you breathe through your mouth? __________________________
Any changes in sleep because of menstruating, pregnancy, or menopause? __________________________
• Use of caffeine, nicotine, alcohol, illicit drugs, and medications, including prescription and over-the-counter sleep aids
• Home environment

OCCUPATIONAL THERAPY INTERVENTIONS
After the client’s sleep profile is complete, and subjective and objective data are collected, the occupational therapist can identify the barriers to sleep and the best intervention. One of the most effective methods to improve sleep is education. After clients understand the importance of sleep and sleep hygiene, they may become more proactive in making choices and lifestyle changes to improve their sleep (Collier & Skitt 2003).

Sleep education: The best intervention for disturbed sleep is to develop an understanding of the benefits of sleep hygiene. Sleep hygiene is defined as lifestyle modification to promote sleep (Green, Brown, & Iwama, 2015). Sleep hygiene includes having a relatively unvarying sleep schedule, with a standard bedtime and waking time every day, including the weekends. Some of the recommendations for daytime routines include limiting daytime naps to 30 minutes (daytime napping does not make up for inadequate nighttime sleep; however, a short nap of 20 to 30 minutes can help to improve mood, alertness, and performance); avoiding stimulants such as caffeine, nicotine, and alcohol close to bedtime; and exercising during the day, including aerobic exercise, walking, swimming, or cycling (or the best night’s sleep, most people should avoid strenuous workouts close to bedtime).

An effective nighttime routine involves instituting a regular sleep and wake schedule, which helps the body recognize when it’s bedtime. This routine includes taking a warm shower or bath, reading a book, or doing light body stretches. Mattresses and pillows should be comfortable. Bright light from lamps, phones, and television screens can make it difficult to fall asleep, so turn off those sources of light or adjust them when possible. Blackout curtains, eye shades, earplugs, “white noise” machines, humidifiers, fans, and other devices can also make the bedroom more relaxing and promote sleep (Solet, 2014).

Clients and caregivers should be educated about the importance of sleep restriction. Sleep restriction means limiting the amount of time spent in bed to actually sleeping. Information about how much time a client spends in bed is typically obtained from 1 to 2 weeks of sleep diary data. Sleep restriction is recommended for clients whose sleep efficiency (total sleep time/time in bed × 100) is less than 85%. After healthy sleep time starts occurring on a regular basis, the amount of time spent in bed is very gradually increased until the individual maintains the healthy sleep duration recommended for their age. If your client is older than 65, the rules are slightly different. The sleep efficiency goal is 80%, and they are allowed a 30-minute nap during the day. Sleep restriction therapy is effective because it strengthens the sleep-and-wake system controlled by the endogenous circadian pacemaker by reducing variability in sleep schedules (Green et al., 2015).

Education about stimulus control is also very helpful. The main objective of stimulus control is to have the client limit the amount of time spent awake in bed and re-associate the bed and bedroom with sleep to regulate the sleep–wake schedules. Guidelines include: (1) going to bed only when feeling sleepy, (2) using the bed and bedroom only for sleep and sexual activities, (3) leaving the bed and bedroom if failure to fall asleep lasts longer than 15 to 20 minutes, and returning only when sleepy; and (4) keeping a fixed wake time in the morning every day. These instructions are designed to help re-establish the bed and bedroom as strong cues for sleep (Pierce & Summers, 2011).

Sleep education should also address activities such as bed mobility, lower body dressing, safe toileting, and fall prevention at night. It is important to include information on comorbidities such as age-related changes, and the effects of medication because of the high prevalence of polypharmacy and the risk of adverse medication interactions and the subsequent side effects (Boswell et al., 2015).

Along with behavioral techniques to help encourage sleep, cognitive therapy techniques can also help. Cognitive therapy is designed to challenge maladaptive beliefs and attitudes that serve to maintain insomnia. Worrying, faulty attributions, or unrealistic expectations of sleep may increase emotional distress, and thus lead to additional sleep disturbance, causing a vicious cycle. Challenging dysfunctional thoughts associated with sleep is believed to decrease the anxiety and arousal associated with insomnia (Siebern et al., 2012).

Relaxation techniques can be effective in reducing physiological hyperarousal. Research conducted by Siebern and colleagues (2012) found that relaxation is especially effective in helping with sleep initiation. Relaxation techniques can be practiced during the day, prior to bedtime, and also in the middle of the night, if the client wakes and is unable to fall back asleep. Common relaxation techniques include progressive muscle relaxation (alternatively tensing and relaxing different muscle groups), deep breathing techniques (diaphragmatic breathing), body scanning (focusing on a body-part sequence that covers the whole body), and autogenic training (visualizing a peaceful scene and repeating autogenic phrases to deepen the relaxation response). Mindfulness-based therapy for insomnia, which includes mindfulness mediation, guided imagery, and biofeedback, can also be incorporated (Siebern et al., 2012).

Regular mealtimes are also helpful to set the body’s clock (Pierce & Summers, 2011). Heavy or rich foods, fatty or fried meals, spicy dishes, citrus fruits, and carbonated drinks can trigger indigestion for some people. Indigestion close to bedtime can lead to painful heartburn that disrupts sleep. A light snack before bedtime (particularly food with protein or a warm beverage like decaffeinated tea) can help with sleep, but heavy food should be avoided (Pierce & Summers, 2011).
Adapting the sleep environment: In addition to good sleep hygiene, a comfortable environment can promote good sleep. If the environment is not inviting and calming, consistent high-quality sleep will be hard to achieve. Occupational therapy practitioners can provide suggestions to decrease environmental interruptions that may impair the ability to sleep, addressing issues related to sleep furnishings, temperature, light, sound, and bed partners.

Light: Circadian rhythms are physical, mental, and behavioral changes that follow a daily cycle (National Institutes of Health [NIH], 2018). They respond primarily to light and darkness in an organism’s environment. Sleeping at night and being awake during the day is an example of a light-related circadian rhythm (NIH, 2018).

A decrease in light is perceived through histamine receptors in the eyes and communicated through the optic nerves to suprachiasmatic nuclei (SCN). The SCN communicates to the pineal gland to either secrete or cease secretion of melatonin (Pierce & Summers, 2011). Melatonin is a hormone produced in the brain that regulates circadian rhythms. When the eyes sense darkness, melatonin is released, triggering the body to fall asleep (Pierce & Summers, 2011). The production of sleep-inducing melatonin decreases with age, further altering circadian rhythms in older adults (Boswell et al., 2015). Natural melatonin is available over the counter, but it is not regulated by the U.S. Food & Drug Administration. Clients should always consult with their primary care physician before taking any medication or supplements.

A Harvard Health Publishing (2012) study found that light of any kind can suppress the secretion of melatonin. However, blue light suppresses melatonin secretion at twice the rate of red or green light, and it can shift circadian rhythms by as long as 3 hours. The display screens of electronic digital devices emit significant amounts of blue light, so they should be avoided for 2 to 3 hours before bed (some devices offer a night screen that reduces the amount of blue light emitted). Clients can also use dim red lights for nightlights, as red light has the least effect on circadian rhythm and melatonin (Harvard Health Publishing, 2012).

Noise: All electronic and mobile devices should be turned off to maintain quiet in the room. Earplugs or noise-cancelling earbuds can be used to block noise (Green et al., 2015)

Room temperature: The room temperature should be kept comfortably cool (60°–70°F) and the room should be well ventilated (Green et al., 2015).

Implications for Occupational Therapy

Occupational therapy practitioners are well equipped to adapt, modify, and provide education about personal and environmental factors to enhance sleep. Implications for occupational therapy practice include:

- Education, advocacy, and self-efficacy are key approaches to promoting sleep in older adults.
- Sleep deficiency in older adults can hinder occupational function and significantly affect quality of life. Furthermore, sleep problems can have a considerable effect on people’s participation in occupations and healthy routines as well as their self-identity (Boswell et al., 2015).
- Sleep problems are so prevalent that occupational therapists should be aware of basic physiology, the relationship between sleep and aging, and the importance of incorporating sleep-screening questions into evaluations, regardless of the client’s current condition (Boswell et al., 2015).
- The promotion of health, well-being, and quality of life should be included in every client’s occupational therapy evaluation and intervention plan to firmly establish the role of occupational therapy in sleep (Pizzi & Richards, 2017).

Conclusion

Non-pharmacological sleep interventions for older adults is an exciting field that is gradually unfolding, and opportunities for occupational therapy practitioners to advance practice and clinical research in this area are extensive (Boswell et al., 2015). Comfortable sleep in old age will not only result in a clear increase in the quality of life for older adults, but it will also help increase the well-being of their caregivers and family, as well as society as a whole (Green et al., 2015).

Occupational therapy practitioners are well positioned to address sleep problems among older adults in a holistic manner to promote health and quality of life (Leland et al., 2014). Practitioners should prioritize research efforts targeting sleep assessments that meet clinical needs and establish a base of evidence for interventions aimed at fostering the intervention process, enhancing participation, and improving life quality and satisfaction for occupational therapy clients (Tester & Foss, 2018).

References

SUGGESTED ACTIVITIES FOR OT PRACTITIONERS

1. Sleep Diary
   Create a sleep diary for yourself. Include sleep schedule, quality of sleep, and any unusual conditions for 2 weeks. Analyze the patterns you find in your sleep diary and describe them. Describe your own sleep routine. Find apps that collect this information and use them for 2 weeks.

2. Occupational Profile of Sleep
   Analyze your own sleep routine, environment, and patterns using the occupational profile of sleep. What did you find out about your sleep that you did not already realize? What changes might improve your sleep? Or, with a partner, practice your professional interviewing skills by administering the occupational profile of sleep. If you were creating this profile on a client, what would your initial plan be for addressing any identified sleep issues?

How to Apply for Continuing Education Credit

A. To get pricing information and to register to take the exam online for the article Managing Sleep Deprivation in Older Adults: A Role for Occupational Therapy go to http://store.aota.org, or call toll-free 877-404-AOTA (2682).

B. Once registered and payment received, you will receive instant email confirmation.

C. Answer the questions to the final exam found on pages CE-9 by March 31, 2021.

D. On successful completion of the exam (a score of 75% or more), you will immediately receive your printable certificate.

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Final Exam
Article Code CEA0319

Managing Sleep Deprivation in Older Adults: A Role for Occupational Therapy

To receive CE credit, exam must be completed by March 31, 2021.

Learning Level: Beginner
Target Audience: Occupational Therapists and Occupational Therapy Assistants
Content Focus: Domain: Sleep; OT Process: Occupational Therapy Evaluation and Interventions

1. As per the Framework, rest and sleep are recognized as core to:
   - A. Education
   - B. Work
   - C. Occupations
   - D. Leisure

2. Engaging in routines such as grooming and undressing, reading, or listening to music to fall asleep are examples of:
   - A. Rest
   - B. Sleep preparation
   - C. Sleep participation
   - D. Sleep performance

3. The effects of sleep deprivation include all the following except:
   - A. High blood pressure
   - B. Anxiety
   - C. Obesit
   - D. Alertness, leading to safe driving

4. Temperature, amount of light, and level of noise in a bedroom are different aspects of which context of sleep?
   - A. Temporal
   - B. Physical
   - C. Social
   - D. Cultural

5. Which one of the following is a summary of a client’s occupational history and experiences, patterns of daily living, interests, values, and needs?
   - A. Analysis of occupational performance
   - B. Therapeutic use of self
   - C. Occupational profile
   - D. Activity analysis

6. Avoiding smoking and heavy meals close to bedtime, limiting caffeine products throughout the day, and avoiding alcohol to aid with sleep are examples of education about which of the following?
   - A. Sleep hygiene
   - B. Stimulus control
   - C. Sleep deprivation
   - D. Sleep restriction

7. Which one of the following has the objective of limiting the time clients spend awake in bed and re-associating the bed and bedroom with sleep to regulate the sleep-wake schedules?
   - A. Sleep hygiene
   - B. Stimulus control
   - C. Sleep deprivation
   - D. Sleep restriction

8. Research suggests that relaxation is especially effective in helping with which one of the following?
   - A. Sleep initiation
   - B. Sleep participation
   - C. Sleep restriction
   - D. Stimulus control

9. Exercise can help promote better sleep and is recommended:
   - A. Right before going to bed
   - B. One hour before bed
   - C. During the daytime
   - D. Never during the daytime

10. To adapt the bedroom environment to promote better sleep, the following steps are recommended except:
    - A. Keep the bedroom bright.
    - B. Turn the lights off.
    - C. Eliminate all sources of noise.
    - D. Use an eye mask and earplugs.

11. The costs of modifying personal and environmental factors for better sleep are:
    - A. Low
    - B. High
    - C. Zero
    - D. Very high

12. Non-pharmacological interventions for promoting better sleep include all of the following except:
    - A. Sleep education
    - B. Sleep restriction
    - C. Stimulus control
    - D. Sleep-aide medications

Now that you have selected your answers, you are only one step away from earning your CE credit. Click here to earn your CE