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Insomnia diagnosis and treatment across the lifespan

Insomnia impairs quality of life and is associated with an increased risk for physical and mental health problems and substance misuse. Here's how you can help.

PRACTICE RECOMMENDATIONS

› *Use a standard validated screening tool for the diagnosis of insomnia in all age groups.* (A)

› *Employ nonpharmacologic interventions as first-line treatment for insomnia in all populations.* (A)

› *Utilize sleep hygiene or cognitive behavioral therapy for insomnia in adolescents and all adults.* (A)

› *Initiate independent cognitive or behavioral therapies with younger children.* (A)

Strength of recommendation (SOR)

(A) Good-quality patient-oriented evidence

(B) Inconsistent or limited-quality patient-oriented evidence

(C) Consensus, usual practice, opinion, disease-oriented evidence, case series

Insomnia disorder is common throughout the lifespan, affecting up to 22% of the population.[1] Insomnia has a negative effect on patients' quality of life and is associated with reported worse health-related quality of life, greater overall work impairment, and higher utilization of health care resources compared to patients without insomnia.[2]

Fortunately, many validated diagnostic tools are available to support physicians in the care of affected patients. In addition, many pharmacologic and nonpharmacologic treatment options exist. This review endeavors to help you refine the care you provide to patients across the lifespan by reviewing the evidence-based strategies for the diagnosis and treatment of insomnia in children, adolescents, and adults.

Defining insomnia

The *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (*DSM-5*) defines insomnia disorder as a predominant complaint of dissatisfaction with sleep quantity or quality, associated with 1 or more of the following[3]:

1. *Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)*
2. *Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)*
3. *Early-morning awakening with inability to return to sleep.*

Sleep difficulty must be present for at least 3 months and must occur at least 3 nights per week to be classified as *persistent* insomnia.[3] If symptoms last fewer than 3 months, insomnia is considered *acute,* which has a different *DSM-5* code ("other specified insomnia disorder").[3] Primary insomnia is its own diagnosis that cannot be defined by other sleep-wake cycle disorders, mental health conditions, or medical diagnoses that cause sleep disturbances, nor is it attributable to the

Studies have shown that older adults who sleep fewer than 5 hours per night have an increased risk for diabetes and metabolic syndrome.

physiologic effects of a substance (eg, substance use disorders, medication effects).[3]

The *International Classification of Sleep Disorders, 3rd edition* (*ICSD-3*) notably consolidates all insomnia diagnoses (ie, "primary" and "comorbid") under a single diagnosis ("chronic insomnia disorder"), which is a distinction from the *DSM-5* diagnosis in terms of classification.[4] Diagnosis of insomnia requires the presence of 3 criteria: (1) persistence of sleep difficulty, (2) adequate opportunity for sleep, and (3) associated daytime dysfunction.[5]

How insomnia affects specific patient populations

Children and adolescents. Appropriate screening, diagnosis, and interventions for insomnia in children and adolescents are associated with better health outcomes, including improved attention, behavior, learning, memory, emotional regulation, quality of life, and mental and physical health.[6] In one study of insomnia in the pediatric population (N = 1038), 41% of parents reported symptoms of sleep disturbances in their children.[7] Pediatric insomnia can lead to impaired attention, poor academic performance, and behavioral disturbances.[7] In addition, there is a high prevalence of sleep disturbances in children with neurodevelopmental disorders.[8]

Insomnia is the most prevalent sleep disorder in adolescents but frequently goes unrecognized, and therefore is underdiagnosed and undertreated.[9] Insomnia in adolescents is associated with depression and suicidality.[9-12] Growing evidence also links it to anorexia nervosa,[13] substance use disorders,[14] and impaired neurocognitive function.[15]

Pregnant women. Sleep disorders in pregnancy are common and influenced by multiple factors. A meta-analysis found that 57% to 74% of women in various trimesters of pregnancy reported subthreshold symptoms of insomnia[16]; however, changes in sleep duration and sleep quality during pregnancy may be related to hormonal, physiologic, metabolic, psychological, and posture mechanisms.[17,18]

Sleep quality also worsens as pregnancy progresses.[16] Insomnia coupled with poor sleep quality has been shown to increase the risk for postpartum depression, premature delivery, prolonged labor, and cesarean delivery, as well as preeclampsia, gestational hypertension, stillbirth, and large-for-gestational-age infants.[19,20]

Older adults. Insomnia is a common

IMAGE: © DAVE CUTLER

complaint in the geriatric population and is associated with significant morbidity, as well as higher rates of depression and suicidality.[21] Circadian rhythms change and sleep cycles advance as people age, leading to a decrease in total sleep time, earlier sleep onset, earlier awakenings, and increased frequency of waking after sleep onset.[21,22] Advanced age, polypharmacy, and high medical comorbidity increase insomnia prevalence.[23]

Studies have shown that older adults who sleep fewer than 5 hours per night have an increased risk for diabetes and metabolic syndrome.[21] Sleep loss also has been linked to increased rates of hypertension, coronary artery disease, myocardial infarction, and possibly stroke.[21,22] Poor sleep has been associated with increased rates of cortical atrophy in community-dwelling older adults.[21] Daytime drowsiness increases fall risk.[22] Older adults with self-reported decreased physical function also had increased rates of insomnia and increased rates of daytime sleepiness.[22]

Technology use prior to bedtime is prevalent and associated with sleep and circadian rhythm disturbances.

Making the diagnosis: What to ask, tools to use

Clinical evaluation is most helpful for diagnosing insomnia.[24] A complete work-up includes physical examination, review of medications and supplements, evaluation of a 2-week sleep diary (kept by the patient, parent, or caregiver), and assessment using a validated sleep-quality rating scale.[24] Be sure to obtain a complete health history, including medical events, substance use, and psychiatric history.[24]

Inquire about sleep initiation, sleep maintenance, and early awakening, as well as behavioral and environmental factors that may contribute to sleep concerns.[10,18] Consider medical sleep disorders that have overlapping symptoms with insomnia, including obstructive sleep apnea (OSA), restless leg syndrome (RLS), or circadian rhythm sleep-wake disorders. If there are co-occurring chronic medical problems, reassess insomnia symptoms after the other medical diagnoses are controlled.

TABLE 1[25-29] includes a list of validated screening tools for insomnia and where they can be accessed. Recommended screening tools for children and adolescents include daytime sleepiness questionnaires, comprehensive sleep instruments, and self-assessments.[25,30] Although several studies of insomnia in pregnancy have used tools listed in **TABLE 1**,[25-29] only the Insomnia Severity Index has been validated for use with this population.[26,27] Diagnosis of insomnia in older adults requires a comprehensive sleep history collected from the patient, partners, or caregivers.[21]

Measuring sleep performance

Several aspects of insomnia (defined in **TABLE 2**[31-33]) are targeted as outcome measures when treating patients. Sleep-onset latency, total sleep time, and wake-after-sleep onset are all formally measured by polysomnography.[31-33] Use polysomnography when you suspect OSA, narcolepsy, idiopathic hypersomnia, periodic limb movement disorder, RLS, REM behavior disorder (characterized by the loss of normal muscle atonia and dream enactment behavior that is violent in nature[34]), or parasomnias. Home polysomnography testing is appropriate for adult patients who meet criteria for OSA and have uncomplicated insomnia.[35] Self-reporting (use of sleep logs) and actigraphy (measurement by wearable monitoring devices) may be more accessible methods for gathering sleep data from patients. Use of wearable consumer sleep technology such as heart rate monitors with corresponding smartphone applications (eg, Fitbit, Jawbone Up devices, and the Whoop device) are increasing as a means of monitoring sleep as well as delivering insomnia interventions.[36]

Actigraphy has been shown to produce significantly distinct results from self-reporting when measuring total sleep time, sleep-onset latency, wake-after-sleep onset, and sleep efficiency in adult and pediatric patients with insomnia.[37] Actigraphy yields distinct estimates of sleep patterns when compared to sleep logs, which suggests that while both measures are often correlated, actigraphy has utility in assessing sleep continuity in conjunction with sleep logs in terms of diagnostic and posttreatment assessment.[37]

TABLE 1

Validated screening tools for diagnosing insomnia[25-29]

Instrument	Description and URL
BEARS Instrument[25a]	5-item tool with age-appropriate versions to assess sleep disorders in children https://cchp.nhs.uk/sites/default/files/Clinical%20Guidelinen%20Sleep%20Managment-%20Appendix%2010%20BEAR%20Sleep%20screen.pdf
Insomnia Severity Index (ISI)[27]	7-item instrument to assess daytime and nighttime components of insomnia www.ons.org/sites/default/files/InsomniaSeverityIndex_ISI.pdf
Insomnia Symptoms Questionnaire (ISQ)[26]	13-item self-report instrument to establish a clinically relevant diagnosis of insomnia www.sleep.pitt.edu/wp-content/uploads/Study_Instruments_Measures/ISQ-instrument.pdf
Pittsburgh Sleep Quality Index (PSQI)[28]	10-item self-report scale assessing sleep over a 1-month interval www.sleep.pitt.edu/wp-content/uploads/Study_Instruments_Measures/PSQI-Instrument.pdf
Epworth Sleepiness Scale (ESS)[29]	8-item self-administered questionnaire that measures general level of daytime sleepiness https://epworthsleepinessscale.com/about-the-ess/

[a] BEARS references 5 domains: **B**edtime problems, **E**xcessive daytime sleepiness, **A**wakenings during the night, **R**egularity and duration of sleep, and **S**noring.

TABLE 2

A glossary of sleep terms[31-33]

Factor	Description
Sleep-onset latency	Length of time in minutes until sleep onset[31]
Total sleep time	Total sleep time in minutes during an in-bed interval[31]
Sleep maintenance	The ability to remain asleep for uninterrupted periods without intermittent awakenings.[33]
Wake-after-sleep onset	Periods of wakefulness occurring after defined sleep onset[31]
Quality of sleep	Patient-reported measure of satisfaction with sleep experience; definition varies by tool and patient perceptions of sleep[32]

Treatment options: Start with the nonpharmacologic

Both nonpharmacologic and pharmacologic interventions are available for the treatment of insomnia. Starting with nonpharmacologic options is preferred.

Nonpharmacologic interventions

Sleep hygiene. Poor sleep hygiene can contribute to insomnia but does not cause it.[31] Healthy sleep habits include keeping the sleep environment quiet, free of interruptions, and at an adequate temperature; adhering to a regular sleep schedule; avoiding naps; going to bed when drowsy; getting out of bed if not asleep within 15 to 20 minutes and returning when drowsy; exercising regularly; and avoiding caffeine, nicotine, alcohol, and other substances that interfere with sleep.[24] Technology use prior to bedtime is prevalent and associated with sleep and circadian rhythm disturbances.[38]

Sleep hygiene education is often insufficient on its own.[31] But it has been shown to benefit older adults with insomnia.[19,32]

Sleep hygiene during pregnancy emphasizes drinking fluids only in the daytime to avoid awakening to urinate at night, avoiding specific foods to decrease heartburn, napping only in the early part of the day, and sleeping on either the left or the right side of the body with knees and hips bent and a pillow under pressure points in the second and third trimesters.[18,39]

Pediatric insomnia. Sleep hygiene is an important first-line treatment for pediatric insomnia, especially among children with attention-deficit/hyperactivity disorder.[40]

Cognitive behavioral therapy for insomnia (CBT-I). US and European guidelines recommend CBT-I—a multicomponent, nonpharmacologic, insomnia-focused psychotherapy—as a first-line treatment for short- and long-term insomnia[32,41,42] across a wide range of patient demographics.[17,43-47] CBT-I is a multiweek intensive treatment that

combines sleep hygiene practices with cognitive therapy and behavioral interventions, including stimulus control, sleep restriction, and relaxation training.[32,48] CBT-I monotherapy has been shown to have greater efficacy than sleep hygiene education for patients with insomnia, especially for those with medical or psychiatric comorbidities.[49] It also has been shown to be effective when delivered in person or even digitally.[50-52] For example, CBT-I Coach is a mobile application for people who are already engaged in CBT-I with a health care provider; it provides a structured program to alleviate symptoms.[53]

Although CBT-I methods are appropriate for adolescents and school-aged children, evaluations of the efficacy of the individual components (stimulus control, arousal reduction, cognitive therapy, improved sleep hygiene practices, and sleep restriction) are needed to understand what methods are most effective in this population.[9]

Cognitive behavioral therapy for insomnia is a first-line treatment for short- and long-term insomnia across a wide range of patients.

Cognitive and/or behavioral Interventions. Cognitive therapy (to change negative thoughts about sleep) and behavioral interventions (eg, changes to sleep routines, sleep restriction, moving the child's bedtime to match the time of falling asleep [bedtime fading],[41] stimulus control)[9,43,54-56] may be used independently. Separate meta-analyses support the use of cognitive and behavioral interventions for adolescent insomnia,[9,43] school-aged children with insomnia and sleep difficulties,[43,49] and adolescents with sleep difficulties and daytime fatigue.[41] The trials for children and adolescents followed the same recommendations for treatment as CBT-I but often used fewer components of the treatment, resulting in focused cognitive or behavioral interventions.

One controlled evaluation showed support for separate cognitive and behavioral techniques for insomnia in children.[54] A meta-analysis (6 studies; N = 529) found that total sleep time, as measured with actigraphy, improved among school-aged children and adolescents with insomnia after treatment with 4 or more types of cognitive or behavioral therapy sessions.[43] Sleep-onset latency, measured by actigraphy and sleep diaries, decreased in the intervention group.[43]

A controlled evaluation of CBT for behavioral insomnia in school-aged children (N = 42) randomized participants to CBT (n = 21) or waitlist control (n = 21).[54] The 6 CBT sessions combined behavioral sleep medicine techniques (ie, sleep restriction) with anxiety treatment techniques (eg, cognitive restructuring).[54] Those in the intervention group showed statistically significant improvement in sleep latency, wake-after-sleep onset, and sleep efficiency (all $P \leq .003$), compared with controls.[54] Total sleep time was unaffected by the intervention. A notable change was the number of patients who still had an insomnia diagnosis postintervention. Among children in the CBT group, 14.3% met diagnostic criteria vs 95% of children in the control group.[54] Similarly, at the 1-month follow-up, 9.5% of CBT group members still had insomnia, compared with 86.7% of the control group participants.[54]

Multiple randomized and nonrandomized studies have found that infants also respond to behavioral interventions, such as establishing regular daytime and sleep routines, reducing environmental noises or distractions, and allowing for self-soothing at bedtime.[55] A controlled trial (N = 279) of newborns and their mothers evaluated sleep interventions that included guidance on bedtime sleep routines, starting the routine 30 to 45 minutes before bedtime, choosing age-appropriate calming bedtime activities, not using feeding as the last step before bedtime, and offering the child choices with their routine.[56] The intervention group demonstrated longer sleep duration (624.6 ± 67.6 minutes vs 602.9 ± 76.1 minutes; $P = .01$) at 40 weeks postintervention compared with the control group.[56]

The clinically significant outcomes of this study are related to the guidance offered to parents to help infants achieve longer sleep. More intervention-group infants were allowed to self-soothe to sleep without being held or fed, had earlier bedtimes, and fell asleep ≤ 15 minutes after being put into bed than their counterparts in the control group.[56]

Exercise. As a sole intervention, exercise for insomnia is readily available and low cost, but it is not universally effective. One study of patients older than 60 years (N = 43) showed that a 16-week moderate ex-

ercise regimen slightly improved total sleep time by an average of 42 minutes (P = .05), sleep-onset latency improved an average of 11.5 minutes (P = .007), and global sleep quality improved by 3.4 points as measured by the Pittsburgh Sleep Quality Index (PSQI; $P \leq .01$).[57] No significant improvements occurred in sleep efficiency. Exercise is one of several nonpharmacologic alternatives for treating insomnia in pregnancy.[58]

A lack of uniformity in patient populations, intervention protocols, and outcome measures confounded results of 2 systematic reviews that included comparisons of yoga or tai chi as standalone alternatives to CBT-I for insomnia treatment.[58,59] Other interventions, such as mindfulness or relaxation training, have been studied as insomnia interventions, but no conclusive evidence about their efficacy exists.[45,59]

Pharmacologic interventions

Pharmacologic treatment should not be the sole intervention for the treatment of insomnia but should be used in combination with nonpharmacologic interventions.[32] Of note, only low-quality evidence exists for any pharmacologic interventions for insomnia.[32] The decision to prescribe medications should rely on the predominant sleep complaint, with sleep maintenance and sleep-onset latency as the guiding factors.[32] Medications used for insomnia treatment (**TABLE 3**[32,60,61]) are classified according to these and other sleep outcomes described in **TABLE 1**.[25-29] Prescribe them at the lowest dose and for the shortest amount of time possible.[32,62] Avoid medications listed in **TABLE 4**[32,36,59,60,62-69] because data showing clinically significant improvements in insomnia are lacking, and analysis for potential harms is inadequate.[32]

Melatonin is not recommended for treating insomnia in adults, pregnant patients, older adults, or most children because its effects are clinically insignificant,[32] residual sedation has been reported,[60] and no analysis of harms has been undertaken.[32] Despite this, melatonin is frequently utilized for insomnia, and patients take over-the-counter melatonin for a myriad of sleep complaints. Melatonin is indicated in the treatment of insomnia in children with neurodevelopmental disorders. (See discussion in "Prescribing for children.")

Hypnotics are medications licensed for short-term sleep promotion in adults and can induce tolerance and dependence.[32] Nonbenzodiazepine-receptor agonists at clinical doses do not appear to suppress REM sleep, although there are reports of increases in latency to REM sleep.[70]

Antidepressants. Although treatment of insomnia with antidepressants is widespread, evidence of their efficacy is unclear.[32,62] The tolerability and safety of antidepressants for insomnia also are uncertain due to limited reporting of adverse events.[32]

The use of sedating antidepressants may be driven by concern over the longer-term use of hypnotics and the limited availability of psychological treatments including CBT-I.[32] Sedating antidepressants are indicated for comorbid or secondary insomnia (attributable to mental health conditions, medical conditions, other sleep disorders, or substance use or misuse); however, there are few clinical trials studying them for primary insomnia treatment.[62] Antidepressants—tricyclic antidepressants included—can reduce the amount of REM sleep and increase REM sleep-onset latency.[71,72]

Antihistamines and antipsychotics. Although antihistamines (eg, hydroxyzine, diphenhydramine) and antipsychotics frequently are prescribed off-label for primary insomnia, there is a lack of evidence to support either type of medication for this purpose.[36,62,73] H1-antihistamines such as hydroxyzine increase REM-onset latency and reduce the duration of REM sleep.[73] Depending on the specific medication, second-generation antipsychotics such as olanzapine and quetiapine have mixed effects on REM sleep parameters.[65]

Prescribing for children. There is no FDA-approved medication for the treatment of insomnia in children.[52] However, melatonin has shown promising results for treating insomnia in children with neurodevelopmental disorders. A systematic review (13 trials; N = 682) with meta-analysis (9 studies; n = 541) showed that melatonin significantly improved total sleep time compared with placebo (mean difference [MD] = 48.26 min-

As a sole intervention, exercise for insomnia is readily available and low cost, but it is not universally effective.

TABLE 3

Medications for primary insomnia treatment[32,60,61a]

		Sleep outcome				
Medication class/name	**Dose**	**Sleep-onset latency**	**Sleep maintenance**	**Rationale**	**SOR**	**Adverse effects**
Nonbenzodiazepines						
Eszopiclone	2 mg or 3 mg	✓	✓	Optimal for prolonging total sleep time compared with placebo.[61] Clinically significant decrease in sleep latency and improvement in quality of sleep compared with placebo	B	Dizziness, dry mouth, headache, somnolence, unpleasant taste, dementia, serious injury, falls with fractures[60]
Zaleplon	5 mg or 10 mg	✓		Clinically significant decrease in sleep latency compared with placebo; no improvement in quality of sleep compared with placebo	B	Headache, asthenia, neurasthenia, pain, fatigue, somnolence, dementia, serious injury, falls with fractures[60]
Zolpidem	10 mg	✓	✓	Clinically significant decrease in sleep latency and improvement in quality of sleep compared with placebo	B	Amnesia, dizziness, sedation, headache, nausea, taste perversion, rebound insomnia after discontinuation, excessive sleepiness at doses > 10 mg, dementia, serious injury, falls with fractures[60]
Benzodiazepines						
Temazepam	15 mg	✓	✓	Reduced wake-after-sleep onset compared with control.[61] Clinically significant decrease in sleep latency and small improvement in quality of sleep compared with placebo; not indicated for older adults because of dementia risk[60,61]	B	Headache, blurred vision, depression, and confusion reported at doses of 20 mg; lethargy, drowsiness, daytime impairment noted at doses of 30 mg; dementia in older adults[60,61]
Triazolam	0.25 mg	✓		Clinically significant decrease in sleep latency[32,61] and moderate improvement in quality of sleep compared with placebo; not indicated for older adults because of dementia risk[60,61]	B	Higher risk for adverse events compared with zaleplon.[61] Little systematic analysis of adverse events; however, "speech disorder" noted; dementia in older adults[60,61]
Melatonin agonist						
Ramelteon	8 mg	✓		Improved sleep-onset latency and increased total sleep time.[61] Clinically significant decrease in sleep latency and no improvement in quality of sleep compared with placebo	B	Headache, nausea, upper respiratory infection, nasopharyngitis, leukopenia[b]

CONTINUED

TABLE 3

Medications for primary insomnia treatment[32,60,61a] (*cont'd*)

		Sleep outcome				
Medication class/name	**Dose**	**Sleep-onset latency**	**Sleep maintenance**	**Rationale**	**SOR**	**Adverse effects**
Tricyclic antidepressant						
Doxepin	3 mg or 6 mg		✓	Low-dose doxepin is optimal for prolonging total sleep time and increased sleep efficiency compared with placebo.[61] Clinically significant improvements in total sleep time and wake-after-sleep onset. Small to moderate improvement in quality of sleep compared with placebo	B	Somnolence, headache (at increased doses)
Orexin-receptor antagonist						
Suvorexant	10 mg, 15/20 mg, or 20 mg		✓	Improved sleep maintenance.[60] Clinically significant improvement in total sleep time, wake-after-sleep onset, and quality of sleep compared with placebo	B	Frequency of daytime somnolence at doses of 15/20 mg. Mild adverse effects, including daytime sedation[60]

SOR, strength of recommendation. See page 18 for SOR definitions.

[a] Adapted from Sateia et al,[32] except where noted.

[b] Leukopenia adverse effect reported in a single study of ramelteon.

utes; 95% CI, 36.78-59.73).[8] In 11 studies (n = 581), sleep-onset latency improved significantly with melatonin use.[8] No difference was noted in the frequency of wake-after-sleep onset.[8] No medication-related adverse events were reported. Heterogeneity (I^2 = 31%) and inconsistency among included studies shed doubt on the findings; therefore, further research is needed.[8]

Prescribing in pregnancy. Prescribing medications to treat insomnia in pregnancy is complex and controversial. No consistency exists among guidelines and recommendations for treating insomnia in the pregnant population. Pharmacotherapy for insomnia is frequently prescribed off-label in pregnant patients. Examples include benzodiazepine-receptor agonists, antidepressants, and gamma-aminobutyric acid–reuptake inhibitors.[45]

Pharmacotherapy in pregnancy is a unique challenge, wherein clinicians consider not only the potential drug toxicity to the fetus but also the potential changes in the pregnant patient's pharmacokinetics that influence appropriate medication doses.[39,74] Worth noting: Zolpidem has been associated with preterm birth, cesarean birth, and low-birth-weight infants.[45,74] The lack of clinical trials of pharmacotherapy in pregnant patients results in a limited understanding of medication effects on long-term health and safety outcomes in this population.[39,74]

A review of 3 studies with small sample sizes found that when antidepressants or antihistamines were taken during pregnancy, neither had significant adverse effects on mother or child.[68] Weigh the risks of medications with the risk for disease burden and apply a shared decision-making approach with the patient, including providing an accurate assessment of risks and safety information regarding medication use.[39] Online resources such as ReproTox (www.reprotox.org) and MotherToBaby (https://mothertobaby.org) are available to support clinicians treating pregnant and lactating patients.[39]

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TABLE 4

Medications *not* recommended for primary insomnia treatment[32,36,59,60,62-69]

Medication class/name	Dose	Rationale	SOR	Adverse effects
Antidepressants				
Mirtazapine	7.5-15 mg	Limited evidence for use as a treatment for non-comorbid insomnia disorder; might increase sleep efficiency; no studies as a treatment for primary insomnia disorder.[62] RCT (N = 19) studying transient insomnia reported "ease in getting to sleep and improved sleep quality"[63]	B	Sedation, daytime somnolence[59,69]
Trazodone	50 mg	No clinically significant improvement in sleep latency, total sleep time, and wake-after-sleep onset[32]; short-term improvement in sleep maintenance and decreased wake-after-sleep onset[64]	B	Headache, somnolence[32]
Anticonvulsant				
Tiagabine	4 mg	Subjective and objective measures of sleep latency fall below clinical significance thresholds[36]; not studied in older adult population[60]	B	Headache, nausea[32]
Antihistamines				
Diphenhydramine	50 mg	Improvements in sleep parameters[a] fall below clinical significance thresholds[32]	B	Drowsiness, grogginess, dizziness[32]; anticholinergic effects (eg, dry mouth, altered mental status, flushing, mydriasis)[60]
Hydroxyzine	25 mg-50 mg	Scarce number of clinical trials studying this medication for insomnia[66]	C	Dry mouth, drowsiness, tremor[65]
Amino acid				
L-tryptophan	250 mg	Efficacy in sleep parameters[a] fall below clinical significance thresholds; no known analysis of harms[32]	B	No reported information regarding adverse effects
Herbal supplement				
Valerian root	Varies	Sleep parameters[a] fall below clinically significant thresholds[32]; unregulated product with small effect on sleep onset latency[60]	B	No serious adverse events noted[32]; residual sedation[60]
Tricyclic antidepressant				
Amitriptyline	50 mg	No clinical trials for primary insomnia; increased sleep latency in 2 trials for secondary insomnia[62]	C	Cardiovascular and central nervous system depression, anticholinergic effects, weight gain, suicidality[67]
Atypical antipsychotics				
Olanzapine, quetiapine	Varies	Minimal evidence supporting these drugs for treatment of primary insomnia[60,62]	C	Postural hypotension, weight gain, constipation, dizziness, personality disorders, akathisia;[68,69] somnolence, dry mouth, extrapyramidal symptoms, tachycardia, dyspepsia[69]

SOR, strength of recommendation. See page 18 for SOR definitions.

[a] Sleep parameters studied were sleep-onset latency, sleep maintenance, wake-after-sleep onset, and total sleep time.

Prescribing for older adults. Treatment of insomnia in older adults requires a multifactorial approach.[22] For all older adults, start interventions with nonpharmacologic treatments for insomnia followed by treatment of any underlying medical and

psychiatric disorders that affect sleep.[21] If medications are required, start with the lowest dose and titrate upward slowly. Use sedating low-dose antidepressants for insomnia only when the older patient has comorbid depression.[60] Although nonbenzodiazepine-receptor agonists have improved safety profiles compared with benzodiazepines, their use for older adults should be limited because of adverse effects that include dementia, serious injury, and falls with fractures.[60]

Keep these points in mind

Poor sleep has many detrimental health effects and can significantly affect quality of life for patients across the lifespan. Use nonpharmacologic interventions—such as sleep hygiene education, CBT-I, and cognitive/behavioral therapies—as first-line treatments. When utilizing pharmacotherapy for insomnia, consider the patient's distressing symptoms of insomnia as guideposts for prescribing. Use pharmacologic treatments intermittently, short term, and in conjunction with nonpharmacologic options. JFP

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