

# Cognitive Behavior Therapy for Chronic Insomnia

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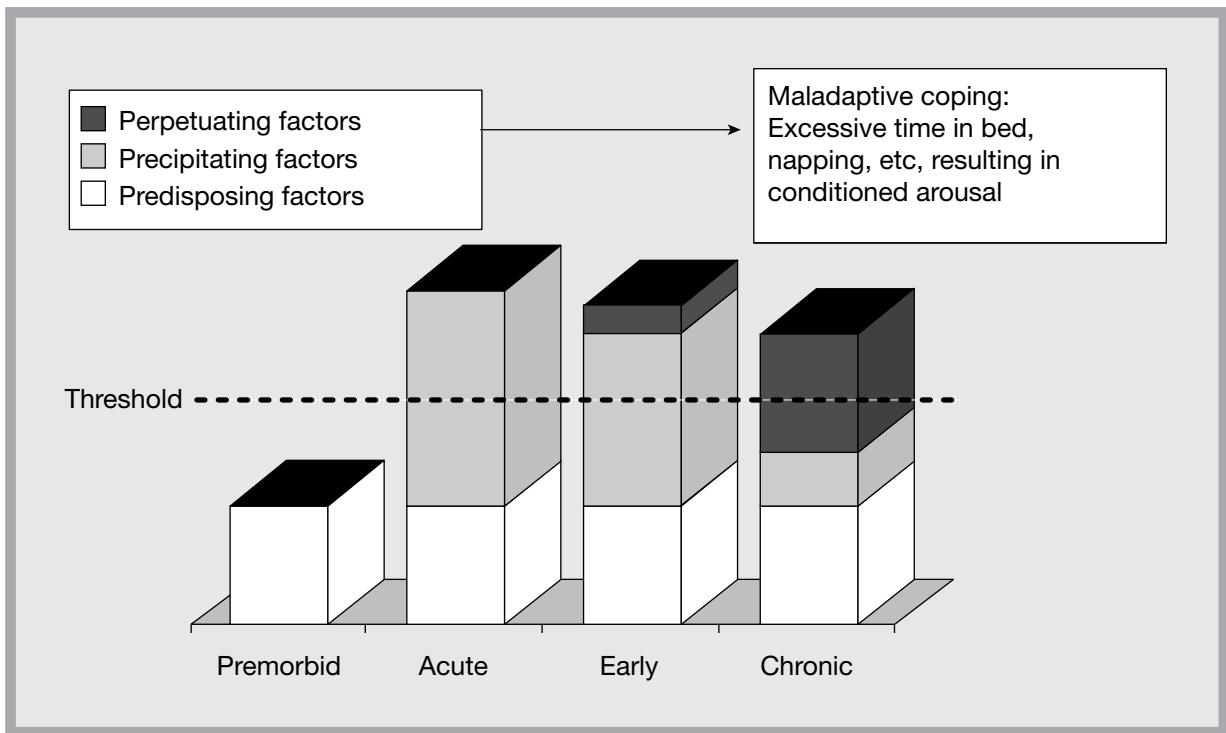
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Approximately 20% of patients presenting in general medical settings have severe and persistent insomnia. Studies consistently find that trouble initiating and maintaining sleep are independent risk factors for medical and psychiatric morbidity, but insomnia is often underdetected and undertreated in primary care settings. Cognitive-behavioral treatment approaches for chronic insomnia and related sleep disorders have been shown to be effective in various patient populations. This article reviews the most common cognitive-behavioral interventions for insomnia, and discusses their efficacy and durability. Possible adaptations for the integration of these approaches into primary care settings and a description of the emerging field of behavioral sleep medicine as a resource for health care providers treating patients with chronic insomnia are also presented. **Clinical Cornerstone Vol. 5, No. 3. Copyright © 2003 Excerpta Medica, Inc.**

Chronic insomnia is an underrecognized and undertreated health problem that affects between 10% to 15% of the general population (1–5), with increased prevalence in women and the elderly (6–9). In primary care settings, persistent insomnia has been estimated to affect nearly 1 in 5 patients (10). Approximately half of these report severe symptoms occurring almost nightly (eg, taking 2 or more hours to fall asleep and/or being awake during the night for more than 1 hour) (11). Large-scale surveys of primary care patients have found insomnia to be associated with increased functional impairment and days of disability due to illness (12). While medical and psychiatric conditions often cause insomnia, research is increasingly demonstrating that persistent trouble initiating and/or maintaining sleep is independently linked to the

development and exacerbation of serious psychiatric and medical morbidities such as major depression (13,14) and coronary artery disease in men (15,16).

The pathophysiologic causes and consequences of chronic insomnia and their involvement in disease processes are poorly understood, but are likely to be multidimensional. Central nervous system hyperarousal (17), chronobiologic dysregulation (18), and dysfunction of the homeostatic mechanisms (19) regulating sleep have been implicated in the disorder. These processes may contribute to an individual's predisposition for insomnia. A multitude of factors potentially can precipitate an insomnia episode. Cognitive-behavioral models of chronic insomnia posit that insomnia from any of the above mechanisms may be perpetuated by maladaptive behaviors. These may include keeping



**Figure.** Behavioral model of insomnia. Adapted with permission from Spielman AJ, Glovinsky P. The varied nature of insomnia. In: Hauri PJ, ed. Case Studies in Insomnia. New York, NY: Plenum Press; 1991:10–15.

irregular bed and wake times, napping, and the use of alcohol as a sedative. Behavioral conditioning can further contribute to chronic insomnia due to the association of bedtime, bedroom, and bed with a state of worry and emotional arousal. These perpetuating factors may evolve as patients attempt to cope with transient or acute insomnia and then maintain the sleep disturbance even in the absence or stabilization of the original precipitants (eg, acute pain, injury, and stress) (Figure). Several epidemiologic studies examining the natural course of insomnia in both chronic pain and other medical conditions indicate that untreated insomnia is an extremely refractory symptom, persisting in as many as 59% to 88% of cases at 2-year follow-up measurement (20,21).

Pharmacologic interventions, eg, the newer benzodiazepine receptor agonists (BZRAs) and sedating antidepressants, and cognitive behavior therapy are 2 forms of insomnia treatment. Unfortunately, two thirds of patients seen in primary care settings receive neither type of treatment (11). The inadequate identification and treatment of

chronic insomnia patients are due to a number of factors, such as limited training about sleep disorders in medical schools (22), the current short-term use indication for BZRAs, and a lack of awareness about the techniques and efficacy of cognitive-behavioral treatment approaches.

### KEY POINT

**Current state-of-the-art cognitive-behavioral treatment for insomnia consists of empirically validated, multicomponent approaches that incorporate stimulus control and/or sleep restriction therapy along with other cognitive-behavioral techniques.**

### COGNITIVE-BEHAVIORAL INTERVENTIONS

The primary cognitive-behavioral interventions for chronic insomnia are stimulus control, sleep restric-

tion, relaxation training, sleep hygiene education, cognitive therapy, and combination or multicomponent therapy. The first-generation nonpharmacologic treatments, which were tested more than 30 years ago, were types of relaxation therapy and sleep hygiene education (23). The current state-of-the-art cognitive-behavioral treatment for insomnia consists of multicomponent approaches that incorporate stimulus control and/or sleep restriction therapy along with other cognitive-behavioral techniques. (24–26). These may be employed in group or individual therapy formats. The current cognitive-behavioral interventions delivered by behavioral sleep medicine specialists represent systematic and data-driven approaches to evaluation and treatment. The therapist and patient monitor insomnia symptoms for a period of 1 to 2 weeks, which can be done with daily sleep diaries or by objective measurements, such as with a continuously worn wrist activity monitor (actigraph). The analysis of activity-monitor data can provide a good estimate of when patients are sleeping and when they are awake during the night. The combination of the subjective sleep diary data and the objective activity-monitor output can be very helpful in assessing progress with treatment, particularly with regard to specific target symptoms. This feedback is actively utilized in the clinical decision making that guides treatment, as well as in other possible evaluations and interventions.

### Stimulus Control Therapy

Stimulus control therapy for insomnia was proposed by Richard Bootzin in 1972 (27). It has been recommended in the American Academy of Sleep Medicine (AASM) practice parameters for the non-pharmacologic treatment of chronic insomnia as a “standard” for both sleep initiation and sleep maintenance patterns of insomnia (28). Stimulus control instructions limit the amount of time patients spend awake in the bed and bedroom. The fundamental goals are to decondition presleep arousal and reassociate the bed and bedroom environment with rapid-onset and well-consolidated sleep. Typical instructions for stimulus control therapy include the following:

- Keep a fixed wake time 7 days per week, irre-

spective of how much sleep achieved during the night;

- Avoid any behavior in the bed or bedroom other than sleep or sexual activity;
- Sleep only in the bedroom;
- Leave the bedroom when awake for ~ 15 to 20 minutes; and
- Return to bed only when sleepy.

The theoretical basis for stimulus control therapy is rooted in classical conditioning theory. Cognitive-behavioral models of insomnia posit that psychophysiological arousal and sleeplessness become learned or conditioned responses to the bedroom environment as a result of the nightly association. Over time, the bed and bedroom stimuli elicit a conditioned arousal response, independent from the original factors such as the specific stressors that had precipitated the initial episode of insomnia. Stimulus control therapy is designed to break the conditioned association between the bedroom environmental stimuli and the sleep-interfering states of arousal and is achieved through a process of counterconditioning that allows the bedroom stimuli to be reestablished as cues for sleep. While little experimental work has directly tested whether chronic insomnia is maintained by classical conditioning, stimulus control therapy has proved to be a robust monotherapy for chronic insomnia in several clinical trials (29–31). It should be noted that while the stimulus control instructions appear simple, they actually may require a substantial change in the patient’s daily routine and can be difficult for some patients to implement successfully without focused guidance from a professional trained in the principles of behavior change.

### Sleep Restriction Therapy

Arthur Spielman and colleagues (32) reported on the beneficial effects of sleep restriction therapy in 1987. This technique essentially is a systematic, controlled form of partial sleep deprivation designed to consolidate sleep rapidly and then gradually increase the scheduled time allotted for sleep when adequate sleep consolidation (efficiency) has been achieved. Sleep restriction therapy consists of curtailing the amount of time spent in bed so that this time frame matches the amount of time the

patient actually spends sleeping. The patient's time in bed is then extended in 15-minute increments each week, pending adequate sleep consolidation. The patient's scheduled morning wake time is held constant throughout treatment. The initial limitation of time in bed and the gradual increases, or reductions, are made within the scheduled bedtime. Sleep opportunity is never restricted to less than 4 to 5 hours to avoid excessive daytime sleepiness. The rule governing the prescription of an earlier bedtime is that the patient must achieve an average sleep efficiency (sleep divided by time in bed) of at least 85% for a week before the time in bed is extended (32,33). Sleep restriction requires that in each session, the subject's sleep diary data be analyzed to calculate weekly sleep efficiency averages to guide the titration of sleep opportunity. In clinical practice as well as research studies, sleep restriction therapy often has been combined with stimulus control and/or other interventions. The efficacy of sleep restriction therapy as a monotherapy has been demonstrated in at least 2 studies (32,34).

Sleep restriction therapy probably is effective for several reasons. Some chronic insomnia patients spend very long periods of time in bed hoping to sleep. Ultimately this is a self-defeating process—it promotes sleep that is shallow and fragmented. Sleep restriction therapy allows patients to cope with their insomnia by restricting their time in bed. Further, the initial sleep loss that occurs with the scheduled sleep restriction may increase the “pressure for sleep,” which in turn produces a more rapid sleep onset, less wake time later during the night, and more efficient sleep. The consistent morning wake time can help establish a circadian rhythm consistent with the desired sleep period.

### **Relaxation Training**

A number of relaxation techniques have been used to decrease the psychophysiological hyperarousal that is thought to interfere with sleep initiation and maintenance in chronic insomnia. Three major relaxation approaches are diaphragmatic breathing, progressive muscle relaxation, and the use of imagery. Diaphragmatic breathing is used to make breathing slower, deeper, and mechanically driven

from the abdomen as opposed to the thorax. Not only is this breathing helpful for relaxation, it resembles that which occurs naturally at sleep onset. Progressive muscle relaxation is used to diminish skeletal muscle tension. It involves systematically tensing and releasing the major muscle groups while focusing attention on the physical sensations of tension contrasted with relaxation. The use of imagery to reduce sleep-related worry and to decrease intrusive presleep cognitive arousal is often incorporated into other forms of relaxation training, and may further help to reduce sleep onset latency (35). Most practitioners select the optimal relaxation method based on the technique that is easiest for the patient to learn and most consistent with how the patient manifests arousal. Effective use of relaxation training usually requires substantial practice. Several studies have found relaxation-based interventions to be independently effective for insomnia (36,37), but less so than stimulus control and sleep restriction therapies (24,38).

### **Sleep Hygiene Education**

Sleep hygiene education was introduced in 1939 (39) and it remains one of the most well-known and misunderstood nonpharmacologic interventions for insomnia. It involves teaching the patient about environmental, lifestyle, and behavioral factors that may influence sleep quality and quantity. The advice may relate to the use of stimulants and alcohol, exercise, and the sleep-wake schedule (**Table**). Some confusion regarding sleep hygiene education may be due to the fact that there is no agreed-upon set of instructions and that many versions of sleep hygiene recommendations incorporate aspects of stimulus control, sleep restriction, and relaxation approaches. Studies have shown that as a monotherapy, sleep hygiene education is largely ineffective (40). While many sleep hygiene issues are perhaps necessary for good sleep, they are not thought to be a sufficient treatment for chronic insomnia. This may be particularly true when the education does not involve a systematic, tailored behavioral analysis of individual factors contributing to poor sleep and a focused counseling effort to assist the patient in making genuine behavioral change.

**TABLE. SLEEP HYGIENE INSTRUCTIONS**

1. **Sleep only as much as you need to feel refreshed during the following day.** Restricting your time in bed helps to consolidate and deepen your sleep. Routinely spending an excessively long time in bed leads to fragmented and shallow sleep. Get up at your regular time the next day, no matter how little you slept.
2. **Get up at the same time each day, 7 days a week.** A regular wake time in the morning leads to regular times of sleep onset, and helps to set your “biological clock.”
3. **Exercise regularly.** Exercise makes it easier to initiate sleep and it helps to deepen sleep. Schedule exercise times so that they do not occur within 3 hours of when you intend to go to bed.
4. **Make sure your bedroom is comfortable and free from disturbing light and noise.** A comfortable, noise-free sleep environment will reduce the likelihood that you will wake up during the night. Noise that does not awaken you may also disturb the quality of your sleep. Carpeting, insulated curtains, and closing the door may help. Background white noise may block out other potentially disturbing noises.
5. **Make sure that your bedroom is at a comfortable temperature during the night.** Excessively warm or cold sleep environments may disturb sleep.
6. **Eat regular meals and do not go to bed hungry.** Hunger may disturb sleep. A light snack at bedtime (especially carbohydrates) may help sleep, but avoid greasy or “heavy” foods.
7. **Avoid excessive liquids in the evening.** Reducing liquid intake will minimize the need for nighttime trips to the bathroom.
8. **Cut down on all caffeine products.** Caffeinated beverages and foods (coffee, tea, cola, chocolate) can cause difficulty falling asleep, awakenings during the night, and shallow sleep. Even caffeine early in the day can disrupt nighttime sleep for some people.
9. **Avoid alcohol, especially in the evening.** Although alcohol helps tense people fall asleep more easily, it causes awakenings later in the night.
10. **Smoking may disturb sleep.** Nicotine is a stimulant. Try not to smoke during the night when you have trouble sleeping.
11. **Don’t take your problems to bed.** Plan some time earlier in the evening for working on your problems or planning the next day’s activities. Worrying may interfere with initiating sleep and produce shallow sleep.
12. **Train yourself to use the bedroom only for sleeping and sexual activity.** This will help condition your brain to see bed as the place for sleeping. Do *not* read, watch TV, or eat in bed.
13. **Do not try to fall asleep.** This only makes the problem worse. Instead, turn on the light, leave the bedroom, and do something different such as reading a book. Don’t engage in stimulating activity. Return to bed only when you are sleepy.
14. **Put the clock under the bed or turn it so that you can’t see it.** Clock watching may lead to frustration, anger, and worry, which interfere with sleep.
15. **Avoid naps.** Staying awake during the day helps you to fall asleep at night.

Adapted with permission from Perlis ML, Youngstead S. The diagnosis of primary insomnia and treatment alternatives. *Compr Ther.* 2000;26:298–306.

## Cognitive Therapy

Several forms of cognitive therapy for insomnia have been developed. They may employ a didactic focus (41), paradoxical intention (42), “distraction and imagery” techniques (35), and cognitive restructuring (43). Studies have shown that the magnitude of treatment response to cognitive-behavioral therapy is significantly associated with the degree to which patients alter their dysfunctional attitudes and beliefs about sleep (44). While specific approaches differ in their procedures, all are based on the observation that patients with chronic insomnia have negative thoughts and beliefs about their condition and its consequences, and these further contribute to the

sleep disturbance. One common tendency is for patients to worry about presumed catastrophic consequences of a poor night’s sleep. Helping patients to challenge the reality of these beliefs and reframe their expectations about sleep may decrease the sleep-interfering anxiety they experience as bedtime approaches. With the exception of paradoxical intention, cognitive therapy approaches generally have not been conducted as a single therapy, but rather are routinely integrated into multicomponent treatment approaches.

Paradoxical intention is a form of cognitive restructuring that involves having patients engage in their most feared behavior, ie, staying awake

instead of trying to sleep. Similar in approach to exposure therapy for anxiety disorders, paradoxical intention aims to reduce performance anxiety, which is thought to interfere with sleep onset. Several studies have found paradoxical-intention strategies to be effective for sleep-onset insomnia (45,46), although treatment gains do not appear to be as robust as stimulus control or sleep restriction, and its utility may be restricted to a small subset of patients.

### **Cognitive Behavior Therapy: A Multicomponent Approach**

Recent empirical approaches to the cognitive-behavioral treatment of insomnia have involved multicomponent treatments that combine stimulus control, sleep restriction, sleep hygiene education, cognitive therapy and, in some cases, relaxation therapy (24,47). Multicomponent approaches have demonstrated efficacy on both objective and subjective sleep-continuity measures in several studies. At least 2 of these have included blinded, randomized, placebo-controlled trials (24,48), and one incorporated a comparison study with a benzodiazepine (25). One of the potential benefits of the multicomponent approach is that it permits the clinician to target several different pathways thought to contribute to insomnia. Currently, not enough empirical data establish the clear superiority of a multicomponent approach over stimulus control or sleep restriction alone. Recently, Harvey and colleagues (49) evaluated the relationship between reported compliance with various cognitive-behavioral therapy components and the maintenance of long-term treatment gains. Durability of treatment effects was independently associated with the reported use of stimulus control/sleep restriction and cognitive restructuring, but not with the use of relaxation exercises.

### **EFFICACY AND DURABILITY**

Two meta-analytic reviews have found cognitive-behavioral treatments for primary insomnia to be efficacious in improving sleep initiation and maintenance parameters. A recent comparative meta-analysis demonstrated that the short-term effects (at 5 weeks) of cognitive-behavioral therapy (including

either sleep restriction or stimulus control components) are generally comparable, and for latency to sleep superior to BZRAs (50). In this study, the overall effect size for cognitive-behavioral therapy was .96 versus .87 for pharmacotherapy, with an overall decrease in symptom severity of ~50% for cognitive-behavioral therapy for insomnia. Perhaps the most important advantage of cognitive-behavioral therapy is the consistent finding that treatment gains are maintained or improved at follow-up periods ranging from 6 months to 2 years (47, 51,52). With the evidence indicating that cognitive-behavioral therapy for insomnia is efficacious and durable, attention now is being directed to the questions of whether it improves daytime functioning and prevents or mitigates the negative health-related outcomes of chronic insomnia, such as major depression and chronic pain disorders.

### **CLINICAL EFFECTIVENESS AND EXTENSION TO SPECIAL POPULATIONS**

Chronic insomnia considered “secondary” to medical and psychiatric disorders is by far the most commonly classified form of insomnia in general medical settings. While many clinical trials have focused on patients with primary insomnia, several investigations now have reported on the effectiveness of cognitive-behavioral therapy for insomnia in clinical settings with patients presenting with comorbid conditions (26,53). Treatment effects from these investigations are similar in scope to the reports on primary insomnia. Cognitive-behavioral therapy for insomnia also has been evaluated in formal clinical trials in patient populations with specific comorbidities, such as chronic pain (54), psychiatric disorders (mixed) (55), and cancer (56). Several studies have also demonstrated robust effects in populations of elderly patients with insomnia (31,48). The reason for the successful application of cognitive-behavioral therapy for insomnia in such diverse populations is likely due to the fact that as insomnia evolves into a chronic symptom, it becomes increasingly likely that maladaptive compensatory strategies and behavioral contingencies play at least some role in maintaining the problem (57).

## KEY POINT

**Three approaches have been evaluated that might serve as models for integrating cognitive-behavioral therapy for insomnia into primary care settings: (a) use of trained nurse clinicians; (b) brief consultation; and (c) self-help approaches.**

## APPLICATION IN PRIMARY CARE SETTINGS

Primary care physicians and related health care providers have the greatest opportunity to identify, evaluate, and treat individuals in the community suffering with insomnia. However, the constraints of time, limited training regarding sleep disorders, and an underrecognition of cognitive-behavioral interventions are just a few of the challenges that make primary care settings a difficult point of intervention. Sedative hypnotic medications are the most recognized and utilized treatment for insomnia in medical settings, but some physicians are reluctant to prescribe BZRAs beyond 4 weeks, although several studies now demonstrate the effectiveness and safety of intermittent dosing regimens extending beyond 1 month (58).

In the cognitive-behavioral domain, 3 novel approaches have been evaluated that might serve as models for integrating cognitive-behavioral therapy for insomnia into primary care settings: (a) use of trained nurse clinicians (26); (b) brief consultation (59); and (c) self-help approaches (48,60). With regard to nurse clinicians, Espie and colleagues (26) conducted an effectiveness study of cognitive-behavioral therapy for insomnia in general medical practices using trained nurses. Treatment was delivered in a 6-session group format to maximize efficiency. Treatment gains, measured as a reduction in self-reported sleep latency, wake after sleep-onset time, and decreased use of sedative hypnotic medication, were maintained at 1-year follow-up within this format. Edinger and Sampson (59) recently reported on a “primary care friendly” consultation

approach in outpatients diagnosed with primary insomnia at a general medical clinic for veterans. Patients were randomized to either 2 sessions lasting 25 minutes with abbreviated cognitive-behavioral therapy for insomnia, or 2 sessions of sleep hygiene education conducted by a clinical psychologist who worked on-site. The abbreviated cognitive-behavioral intervention was found to be superior to sleep hygiene education, with ~52% of the abbreviated-intervention patients benefiting from at least a 50% reduction in wake after sleep-onset time and 56% achieving normal scores on an insomnia severity index at the 3-month posttreatment assessment. Finally, several investigators have tested whether self-help versions of cognitive-behavioral therapy interventions delivered systematically in weekly installments via the mail and/or augmented with minimal therapist phone contacts are beneficial (48,60). These studies suggest that self-help approaches may help a substantial number of patients and that the addition of brief therapist contact, either by phone or in person, may provide additional benefit. To date, Internet adaptations of cognitive behavioral therapy for insomnia have not been tested, but when combined with either primary care or expert evaluation and monitoring, this approach represents a significant opportunity to reach millions of patients who otherwise might not receive any help for their insomnia.

## BEHAVIORAL SLEEP MEDICINE: WHO DOES IT AND HOW TO REFER

In addition to incorporating the evaluation and treatment of insomnia into primary care settings, a valuable resource would be a behavioral sleep medicine specialist for consultation and referral. Until recently, referrals for evaluation and treatment of insomnia and other sleep disorders with behavioral/psychological involvement were limited, because appropriately trained professionals could not be located consistently. Further, many sleep disorders centers have focused exclusively on evaluating and treating sleep apnea. In recent years the AASM has recognized the need for multidisciplinary, full-service sleep disorders centers and has required that accredited centers have a systematic program to provide patients access to behavioral sleep medicine ser-

vices. Recently, the AASM developed a board certification examination, which is open to doctoral-level clinicians with postdoctoral training in behavioral sleep medicine—the first exam was administered in June 2003. A growing cadre of credentialed clinicians now provide these services. While most behavioral sleep medicine specialists are clinical psychologists, the exam is open to physicians and other licensed doctoral-level professionals with appropriate training. The most straightforward approach to referring patients for behavioral sleep medicine services is to contact an AASM-accredited sleep disorders center. A list of centers categorized by state can be found at: <http://www.aasmnet.org/listing.htm>.

### KEY POINT

**When a patient presents with difficulty initiating or maintaining sleep at least 3 nights per week, referral to a sleep disorders center should be considered based on the duration of the complaint or the severity of associated daytime impairment. Behavioral sleep medicine specialists trained to evaluate and treat chronic insomnia are now a required discipline with accredited sleep disorders centers.**

### WHEN TO REFER

With the field of behavioral sleep medicine rapidly expanding within organized sleep medicine, questions arise as to when primary care physicians should consider referring their patients to a sleep disorders center in general and for behavioral sleep medicine services in particular. When patients present with clear signs, symptoms, or risk factors for primary sleep disorders, such as sleep apnea (obesity, persistent snoring, daytime sleepiness), periodic limb movement disorder (report of nocturnal leg jerks, daytime fatigue, and sleepiness), or narcolepsy (excessive daytime sleepiness, cataplexy), a sleep disorders center consultation clearly is appropriate. If a patient reports excessive daytime sleepiness,

especially falling asleep at inappropriate times or places, referral for a general sleep evaluation should be considered. When a patient presents with difficulty initiating or maintaining sleep at least 3 nights per week, referral to a sleep disorders center should be considered based on the duration of the complaint or the severity of associated daytime impairment. While there is no general consensus on what constitutes chronic insomnia, a reasonable clinical guideline is persistent symptoms for more than 1 month. In determining who is an appropriate candidate for cognitive-behavioral therapy for insomnia, behavioral sleep medicine specialists focus primarily on whether: (a) an underlying medical or psychiatric condition is either being addressed or is stabilized; (b) the patient meets minimum criteria for sleep continuity disturbance; and (c) there are signs of maladaptive behavioral factors that appear to maintain the insomnia. It should be noted that insomnia patients who are taking hypnotics (and wish to continue) or who have chronic medical or psychiatric illnesses may be excellent candidates for cognitive-behavioral therapy.

### SUMMARY

Insomnia is one of the most common complaints encountered in primary care settings, and its possible causes are numerous. Comorbidity with medical and psychiatric disorders is an important contributing factor. Optimal management of underlying disorders is necessary, but may not resolve chronic insomnia that is maintained by behavioral and psychosocial factors. Specific treatment for insomnia may be required. Nonpharmacologic treatment approaches address both physiologic and psychologic features of normal sleep as well as the processes that can undermine the ability to achieve good sleep. Specific therapies include stimulus control, sleep restriction, relaxation, cognitive therapy, and sleep hygiene education. Often, features of these are combined into a cognitive-behavioral therapy for insomnia. Abundant scientific literature now demonstrate the efficacy of single and combined components of these nonpharmacologic treatments, and particularly impressive is their potential for long-term positive outcomes. Cognitive-behavioral treatments for insomnia may

be incorporated into a primary care setting or may be provided by behavioral sleep medicine specialists.

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## Dialogue Box

### EDITORIAL BOARD

**What is the mechanism for the particularly strong association of insomnia and men with coronary artery disease (CAD)?**

#### SMITH

The finding that insomnia, particularly trouble initiating sleep, increases risk for CAD mortality is based on prospective epidemiologic data and so the underlying mechanisms for this association remain unclear. There are several possibilities that might account for this linkage: (1) insomnia is a symptom of generalized sympathetic arousal, which increases risk for cardiac morbidity; (2) the relationship might be secondary to the cumulative effects of chronic partial sleep deprivation on physiologic processes; (3) insomnia is a risk factor for depression and depression has been shown to increase risk for CAD morbidity, especially in males. It is likely that mechanisms related to all 3 of these general processes may play a role. In the recent study by Mallon et al (2002), sleep onset insomnia was an independent predictor of CAD mortality, even after controlling for depression, sleep duration, and other relevant risk factors. Because of this finding, I am inclined to think that increased activity of the hypothalamic-adrenal-pituitary axis, which has been shown to be hyperactive in patients with insomnia, may be a particularly important mediator of the relationship between insomnia and cardiovascular disease. Not enough data are available to speculate on possible reasons for gender differences.

### EDITORIAL BOARD

**What is the efficacy of stimulus control therapy and sleep restriction therapy in patients with insomnia?**

#### SMITH

Both of these interventions have demonstrated

empirical support in the literature as described in the manuscript. As a monotherapy, stimulus control has received more support, but this is likely due to the fact that there simply have been more studies conducted with stimulus control as the sole intervention. In my clinical experience, I have found sleep restriction therapy to be the most effective intervention. In fact, it is entirely possible that one of the mechanisms of action of stimulus control therapy is the short-term increase in homeostatic pressure for sleep. For many patients, the instructions to get out of bed when unable to sleep actually increase partial sleep deprivation during the initial phases of treatment. This temporary increase in sleep debt may serve to rapidly consolidate sleep similar to sleep restriction therapy.

### EDITORIAL BOARD

**What is the role of short-acting hypnotics, such as the newer BZRA agents, as an adjunct to cognitive behavior therapy (CBT)? Are they used when initiating CBT to relieve the worry and emotional arousal that may be perpetuating insomnia? Should BZRAs be used intermittently when an episode of insomnia unexpectedly occurs?**

#### SMITH

These are very important questions, which are currently the major focus of ongoing research by a number of groups. The jury is essentially out on the best way to combine pharmacotherapy with behavior therapy. This is quite an attractive approach because CBT-I generally takes 2 to 4 weeks to achieve efficacy that is comparable to BZRAs. It would be an ideal scenario to start patients on a BZRA while simultaneously initiating CBT. This approach promises the best of both worlds—immediate symptom relief associated with the BZRA and the long-term maintenance of treatment gains that

## Dialogue Box

is provided by CBT-I. The major caveat is that there are some data to suggest that initiating CBT-I and pharmacotherapy simultaneously might undermine the patient's willingness and effort to truly practice, learn, and experience the benefits of the cognitive-behavioral treatment. Taking a pill is certainly much easier than CBT-I and there is a powerful attribution bias that pills are stronger than psychological or behavioral interventions. At the present time, if the patient has chronic insomnia and is motivated to achieve a long-term solution, CBT-I at the outset may be the best bet. In practice, my experience has been that many patients with chronic insomnia have tried sedative hypnotics before seeking behavioral sleep medicine treatment. It should be noted that many patients who have been taking hypnotics long term continue to have significant insomnia. The data show that these patients, even when they remain on medications, can still benefit from CBT-I.

The idea of using BZRAs for long-term maintenance or to relieve an episode of insomnia makes sense to me if framed within the context that patients should continue to practice the cognitive-behavioral strategies prophylactically. Patients who have chronic insomnia and have learned to manage their insomnia via cognitive-behavioral methods are still vulnerable to transient insomnia, and I see no reason why they should not take advantage of these relatively safe and effective medications. Several studies of the newer BZRAs have demonstrated that longer-term, intermittent dosing regimens are quite effective with no evidence of tolerance or dependence.

### EDITORIAL BOARD

**Elaborate on the role that naps play in perpetuating insomnia. How do you convince patients who have come to rely on them to not take naps in the early stages of therapy?**

### SMITH

The timing, duration, and quality of sleep are governed by an interaction of homeostatic and circadian factors. The longer you have been awake increases the likelihood that you will fall asleep and sleep is more likely, depending on the timing of your circadian rhythm. Long naps potentially “deprime” the sleep homeostat, making it more difficult to fall asleep when desired at night. Patients with insomnia sometimes find themselves caught up in a vicious cycle. They have a poor night's sleep and compensate the next day by taking a long nap in the late afternoon, when there is increased chronobiologic propensity for sleep. They then have more difficulty falling asleep that night and again cope with their fatigue the next day by napping. Having said this, there is a great deal of individual difference with respect to sleep need and napping. Many good sleepers do quite well taking a brief nap on a daily basis. In providing patients the rationale for sleep restriction therapy, I explain to them that cutting out naps in the short term will speed up the treatment effects. The worst-case scenario for patients is to marginally comply with the therapy, which unnecessarily prolongs their suffering and may undermine their belief in the efficacy of CBT-I and consequently deprive them of the potential long-term benefits. Sometimes, it is helpful to motivate patients by reviewing their sleep diary data to graphically show them the relationship between daytime napping and insomnia severity.

### EDITORIAL BOARD

**With sleep restriction therapy, how is sleep efficiency assessed?**

### SMITH

With sleep restriction therapy, sleep efficiency is typically assessed by calculating this parameter from the subjective sleep diary data (total sleep

## Dialogue Box

time/time in bed). When instructing patients how to complete sleep diaries, they are discouraged from clock watching and recording the timing of middle-of-night awakenings. These behaviors typically increase the performance anxiety about sleeping, which can exacerbate the problem. Some clinicians and researchers do have patients record their bedtime at lights out. I fall into this camp. Others have patients make retrospective ratings on waking. Sleep diaries are significantly associated with polysomnographic assessment, but patients with insomnia have been reliably shown to overestimate the severity of sleep continuity disturbance compared to polysomnography. In clinical practice, patients' subjective judgments of sleep quality and quantity are necessary for diagnosis, to motivate treatment seeking, and in guiding treatment. Using outside observer ratings are generally not necessary or practical.

### EDITORIAL BOARD

#### What is meant by background "white" noise?

#### SMITH

White noise is simply a monotonous sound that helps to screen out extraneous environmental sounds. The noise made by a fan or air conditioner would be a close analogue of white noise. There is some evidence to suggest that patients with insomnia are hyperresponsive to environmental stimuli, which may interfere with sleep initiation and main-

tenance. White noise machines, which can be purchased online and in many electronic stores may be useful, especially if patients live in areas of increased noise, such as near airports, in the city, etc. Patients should be cautioned not to use popular noise machines with variable sounds (eg, beach sounds with birds chirping in the background). The brain orients to noises that stand out from the background and so these types of sound tracks are not optimal.

### EDITORIAL BOARD

#### What self-help resources are available for teaching patients how to implement some of the CBT interventions on their own?

#### SMITH

I would recommend that all patients with significant chronic insomnia be evaluated by a specialist before initiating any type of self-help approach. Several excellent self-help books on insomnia can be readily purchased at most major bookstores. Here are the ones that I have read and have recommended to patients: *No More Sleepless Nights* by Peter Hauri; *Say Goodnight to Insomnia* by Gregory Jacobs and Herbert Benson; *All I Want Is a Good Night's Sleep* by Sonia Ancoli-Israel; *Desperately Seeking Snoozing* by John Weidman.

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