Chapter 15

Brief Behavioral Treatment of Insomnia

Anne Germain, Daniel J. Buysse

Department of Psychiatry, University of Pittsburgh School of Medicine, Pittsburgh, PA

PROTOCOL NAME

Brief Behavioral Treatment of Insomnia (BBTI).

GROSS INDICATION

BBTI is indicated for the treatment of insomnia, defined as difficulty falling or staying asleep, early morning awakenings, or complaints of non-restorative sleep, occurring on more days than not over more than a month, and associated with significant distress or functional impairments [1].

SPECIFIC INDICATION

BBTI is indicated for the treatment of primary insomnia, or insomnia comorbid with other psychiatric, medical, or sleep disorders.

CONTRAINDICATIONS

Caution should be exercised in using BBTI with patients with a diagnosis of bipolar disorder or psychotic disorder, as the transient, mild sleep restriction induced by BBTI may exacerbate these conditions. The prescription for time in bed during BBTI with older adults should generally not be less than 6 hours to reduce the risk of falls. Because of the transient sleepiness associated with sleep restriction, caution should also be exercised for patients who operate heavy machinery or drive a car regularly.

RATIONALE FOR INTERVENTION

BBTI is similar to standard cognitive behavioral treatment of insomnia (CBT-I) in combining and emphasizing the early implementation of stimulus control and sleep restriction principles and procedures. These methods have

Behavioral Treatments for Sleep Disorders. DOI: 10.1016/B978-0-12-381522-4.00015-8

been shown to increase sleep consolidation and improve sleep quality [2–5]. Education about healthy sleep practices and behaviors that affect sleep quality and consolidation is also provided to patients in BBTI in a way that is comparable to CBT-I. However, BBTI differs from standard CBT-I in important ways. BBTI uses a reduced number of in-person visits, and a shorter length of the intervention in BBTI (two in-person visits over 4 weeks) compared to CBT-I (six to eight in-person visits over 8 weeks). In addition, BBTI does not systematically address or restructure erroneous beliefs and attitudes about sleep, insomnia, and the potential consequences of poor sleep.

BBTI was developed to address common barriers encountered in the dissemination of evidence-based CBT-I. The first barrier relates to difficulties in implementing CBT-I in the clinical settings where the majority of patients with insomnia complaints seek care (e.g., primary care clinics). CBT-I requires weekly visits over a period of 8 weeks. BBTI, with two in-person visits over a period of 4 weeks, offers a potentially more feasible format in this setting. A second barrier relates to the provider offering CBT-I. CBT-I is typically delivered by a PhD-level clinician, with extensive training in behavioral sleep medicine. Sleep specialists are rarely available in primary care settings, where the majority of patients seek care, and there is evidence that Master's-level clinicians (nurses, social workers) can effectively deliver a primary intervention for insomnia in these settings. For instance, primary care clinic nurses can effectively deliver behavioral interventions for insomnia with minimal supervision in a small-group format [2]. BBTI may offer a first-line intervention for a majority of patients seen in primary care settings, whereas CBT-I may be best for patients who require a higher "dose" of treatment, delivered in a specialty care clinic.

The general rationale for BBTI is that modifying waking behaviors can directly impact the two major physiological mechanisms that regulate sleep: the homeostatic and circadian drives (Figure 15.1). The homeostatic sleep drive refers to the increased propensity for sleep with increasing duration of wakefulness (Figure 15.1a). The circadian drive refers to the variations in brain and body biological processes that are regulated by the central pacemaker, also known as the biological clock. The circadian drive promotes or inhibits the propensity to remain alert and/or fall and stay asleep throughout the 24-hour cycle. In humans, sleep is promoted during darkness and is coincident with the peak of melatonin release from the pineal gland, and the nadir of core body temperature and cortisol secretion (Figure 15.1b). When individuals sleep at a suboptimal circadian time, as is the case with delayed sleep phase syndrome or shift work, sleep is perceived to be of poorer quality, lighter, and more disrupted. The goal of BBTI is to modify waking behaviors that increase and regulate the duration of wakefulness (homeostatic drive), and identify an individualized prescription for sleep and wake time that is consistent with the circadian process. Aligning the homeostatic and circadian drives (as indicated by the gray arrows in Figure 15.1) by changing waking behaviors, then,

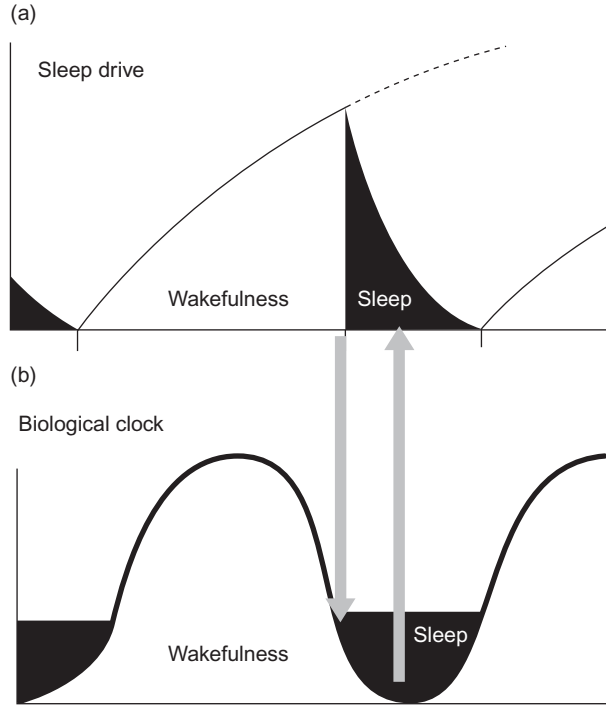

FIGURE 15.1 The two-process model of sleep regulation.

facilitates sleep onset, enhances sleep consolidation, and promotes restorative sleep and daytime alertness.

The core components of BBTI are principles of stimulus control [6] and sleep restriction [3]. Stimulus control aims at limiting the use of the sleep environment (bed, bedroom) to sleep. Sleep restriction involves the implementation of a regular sleep–wake schedule, which limits time spent in bed in order to promote sleep consolidation. Together, stimulus control and sleep restriction enhance the two major physiological processes that control sleep, thereby aligning the timing and duration of sleep. Several meta-analyses have demonstrated the efficacy and durability of these behavioral interventions for primary insomnia and comorbid insomnia (see, for example, Morin et al. [4] and Smith et al. [5]). Specifically, stimulus control and sleep restriction are associated with significant improvements in sleep latency, sleep duration, and sleep efficiency (ratio of time spent asleep/time spent in bed while awake or asleep), as well as with improvements in daytime symptoms and functioning. Thus, BBTI combines these two evidence-based techniques to reduce insomnia.

STEP BY STEP DESCRIPTION OF PROCEDURES

BBTI is a manualized intervention delivered over four consecutive weeks, which includes two individual in-person visits on Weeks 1 and 3, and telephone appointments on Weeks 2 and 4. The duration of the first treatment visit is 45 minutes, and the follow-up visit on Week 3 generally lasts no more than 30 minutes. Brief (<20 minutes) telephone sessions are conducted on Weeks 2 and 4 to address any questions or difficulties that may have arisen in the previous weeks, to encourage adherence to the prescribed sleep schedule, or to modify the prescribed sleep schedule if necessary.

The first session aims at providing accurate and concise background information about mechanisms of sleep regulation (i.e., homeostatic and circadian drives), and general information about behaviors that promote or interfere with sleep. This component provides the rationale for both stimulus control and sleep restriction. To reduce sleep-related insomnia symptoms (i.e., difficulty falling and staying asleep), stimulus control instructions and sleep restriction are then implemented. Stimulus control instructions involve limiting the bed and the sleep environment to sleep (and sexual activity). The rationale is that the timing of sleep is a learned behavior contingent upon the environment. Activities other than sleep and sexual activity, such as watching television, reading, and worrying, are prohibited in the bed and bedroom, and must be performed in other rooms. Access to the bed and the bedroom are allowed only when the person feels sleepy. When the patient awakens during the night and cannot return to sleep, the patient is instructed to leave the bed, and to perform pre-determined activities involving minimal stimulation and minimal light levels to foster sleepiness. Strict adherence to the prescribed rise time is strongly reinforced during this session. Light exposure in the morning has an important role in triggering wake signals for the biological clock.

Sleep restriction aims at limiting the number of hours in bed to match the actual number of hours spent asleep, plus 30 minutes to allow for normal time to fall asleep and nocturnal awakenings. Sleep restriction improves sleep efficiency, or the ratio of total number of hours of sleep to number of hours spent in bed. Sleep restriction is usually associated with mild sleep deprivation, which favors increased homeostatic drive, and sleep consolidation. Ideally, the prescribed sleep–wake schedule is derived from sleep diary data collected over the previous 7–14 days. In the absence of a sleep diary, retrospective estimates of recent sleep–wake patterns can be used. First selecting the rise time with the patient and then working backwards to establish bedtime is helpful. The prescribed sleep–wake schedule, as well as the list of activities identified for occupying evening, middle of the night, and morning wakefulness should also be realistic, and accommodate the patient's living conditions and responsibilities.

The first session also includes a focus on identifying activities to be performed in the morning to enhance the patient's ability to get out of bed, and adhere to the prescribed sleep–wake schedule. The temporary nature of the

prescribed sleep schedule is also highlighted. Time allowed in bed can be increased over time, when sleep latency and wake time after sleep onset are less than 30 minutes per night, on most nights.

At the end of the first session, the patient receives the prescribed sleep–wake goals, and the list of selected activities to be performed out of bed when awake. Patients should also receive a sleep diary to monitor improvements in sleep, as well as to monitor adherence to the prescribed schedule.

As mentioned above, a brief follow-up telephone call is completed on Week 2 to address any questions or difficulties that may have arisen in the previous weeks, to encourage adherence to the prescribed sleep schedule, or to modify the prescribed sleep schedule if necessary.

Week 3 is an in-person visit, and serves three main purposes: (1) to address possible difficulties regarding the application of the techniques encountered during the previous week; (2) to continue close monitoring of and reinforce adherence to treatment recommendations; and (3) to provide education on how to expand time allowed in bed. Specifically, increasing time spent in bed is allowed if sleep latency and wake time after sleep onset are less than 30 minutes on most nights, based on prospective information collected with sleep diaries. The number of hours allowed in bed can then be increased by 15 minutes (by advancing bedtime or delaying rise time), and the patient is instructed to maintain the new time in bed for 1 week. If sleep latency and wake time after sleep onset (WASO) both remain below 30 minutes on most nights, then the patient is allowed to add another additional 15 minutes in bed for a week. On the other hand, if sleep latency and WASO exceed 30 minutes, then the patient is instructed to decrease time in bed by 15 minutes. In BBTI, modification to the time allowed in bed is thus determined by maintaining sleep latency and wake time after sleep onset below the clinical thresholds of 30 minutes, rather than based on sleep efficiency $\geqslant$85 percent.

On Week 4, another follow-up phone call is conducted to address any difficulties, monitor adherence, and further increase time in bed if sleep remains consolidated, but daytime sleepiness is present. A final, brief in-person visit is then scheduled after 1 or 2 weeks to review progress, to review the rationale of BBTI and the instructions for stimulus control and sleep restriction, and to review the instructions for lengthening or shortening time spent in bed.

POSSIBLE MODIFICATIONS/VARIANTS

Variants of BBTI include in-person visits rather than telephone contacts on weeks 2 and 4, and providing audiocassettes containing sleep education [7] at the end of treatment sessions. Alternative modes of BBTI delivery, such as self help, instructions delivered by mail, web-based or telephone-based delivery methods, have not yet been tested. BBTI can be used concomitantly with sleep medications if the use of hypnotics is not associated with full remission of sleep-related insomnia symptoms.

PROOF OF CONCEPT/SUPPORTING DATA/EVIDENCE BASE

There is growing evidence that BBTI and related brief therapies are associated with rapid (<4 weeks) improvements in sleep latency, wake time after sleep onset (WASO), sleep efficiency, and overall sleep quality, including reduced severity of insomnia and remission of insomnia. One trial assessed the effects of a brief behavioral intervention combining education, stimulus control, and sleep restrictions, and delivered over two 25-minute sessions delivered 2 weeks apart by a junior-level clinical psychologist, compared to a sleep hygiene education intervention equated for time spent with the therapist and on homework assignments [7]. Post-treatment assessments were conducted 2 weeks and 3 months after the end of treatment, using sleep logs and self-report questionnaires. Improvements in sleep log measures of sleep latency, WASO, and sleep efficiency were greater in the intervention group than in the control group. Furthermore, the magnitude of the improvements observed in the intervention group was similar to the improvement previously observed in the randomized clinical trial with CBT-I.

A preliminary report on an ongoing clinical trial conducted by an independent group corroborated clinically meaningful improvements in self-report and sleep log measures in older adults (age <60 years old) who received BBTI, compared to an information control (IC) condition. Post-treatment, participants who received BBTI showed clinically meaningful improvements in global self-report and sleep diary measures of sleep latency, WASO, and sleep efficiency, as well as improvements in daytime symptoms of depression and anxiety, compared to participants assigned to an information control (IC) condition. In the BBTI group, effect sizes for sleep latency ($d = 0.80$), WASO ($d = 0.67$), and sleep efficiency ($d = 0.64$) were comparable to those reported in CBT-I trials. Seventy-one percent of the BBTI participants and 39 percent of the IC participants met criteria for treatment response, as defined by a reduction of ⩾3 points on the Pittsburgh Sleep Quality Index (PSQI; [8]), or an increase in sleep efficiency of ⩾10 percent. Remission was defined as meeting response criteria, and having a PSQI score of 5 or less or sleep efficiency greater than 85 percent after treatment. Remission was observed in 53 percent of the BBTI criteria, and 17 percent of the IC participants. Preliminary analyses of follow-up data suggest that these improvements are maintained over 6 months [9]. A final report on this clinical trial, with a total of 79 older adults, is in preparation.

Another study investigated the optimal number of treatment sessions in adults with primary sleep maintenance insomnia, by randomizing participants to one, two, four, or eight individual sessions that were delivered over the course of 8 weeks, or to a wait-list control condition. All active treatment conditions involved a first session where education and specific instructions on stimulus control and sleep restriction were delivered. For groups involving more than treatment session, additional sessions consisted of review of the material provided in the first session, adherence reinforcement, and guidance on how to adjust time allowed in bed. Results indicated that one and

four individual sessions delivered over the 8-week period showed significant improvements in diary and actigraphic measures of sleep efficiency, WASO, total wake time (WASO + sleep latency), and a greater rate of treatment response than the other conditions. Objective improvements in wake time and sleep efficiency were maintained in the four-session group. The authors suggested that the four-session intervention delivered biweekly may optimize the balance between patients' engagement in treatment and therapist's guidance.

PROOF OF CONCEPT/SUPPORTING DATA/EVIDENCE BASE

There is growing evidence supporting the efficacy of brief behavioral treatments, including BBTI, for primary and comorbid insomnia. A transient increase in daytime sleepiness is the main side effect reported and expected, given the mild sleep deprivation associated with sleep restriction. Improvements in sleep latency, WASO, sleep efficiency, and overall sleep quality are also associated with reductions in daytime symptoms of depression and anxiety.

REFERENCES

[1] American Academy of Sleep Medicine, P.J. Hauri, M.J. Sateia, The International Classification of Sleep Disorders, Second Edition (ICSD-2): Diagnostic and Coding Manual, American Academy of Sleep Medicine, Westchester, IL, 2005.

[2] C.A. Espie, K.M.A. MacMahon, H.L. Kelly, et al., Randomized clinical effectiveness trial of nurse-administered small-group cognitive behavior therapy for persistent insomnia in general practice, Sleep 30 (5) (2007) 574–584.

[3] A.J. Spielman, P. Saskin, M.J. Thorpy, Treatment of chronic insomnia by restriction of time in bed, Sleep 10 (1) (1987) 45–56.

[4] C.M. Morin, J.P. Culbert, S.M. Schwartz, Nonpharmacological interventions for insomnia: a meta-analysis of treatment efficacy, Am. J. Psychiatry 151 (8) (1994) 1172–1180.

[5] M.T. Smith, M.L. Perlis, A. Park, Comparative meta-analysis of pharmacotherapy and behavior therapy for persistent insomnia, Am. J. Psychiatry 159 (1) (2002) 5–11.

[6] R.R. Bootzin, P.M. Nicassio, Behavioral treatments of insomnia, in: M. Hersen, R.E. Eisler, P.M. Miller, (Eds.), Progress in Behavior Modification, Academic Press, New York, NY, 1978, pp. 1–45.

[7] J.D. Edinger, W.S. Sampson, A primary care "friendly" cognitive behavioral insomnia therapy, Sleep 26 (2) (2003) 177–182.

[8] D.J. Buysse, C.F. Reynolds, III, T.H. Monk, et al., The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research, Psychiatry Res. 28 (2) (1989) 193–213.

[9] A. Germain, D.E. Moul, P.L. Franzen, et al., Effects of a brief behavioral treatment for late-life insomnia:Preliminary findings, J. Clin. Sleep Med. 2 (4) (2006) 403–406.

RECOMMENDED READING

R.R. Bootzin, P.M. Nicassio, Behavioral treatments of insomnia, in: M. Hersen, R.E. Eisler, P.M. Miller (Eds.), Progress in Behavior Modification, vol. 6, Academic Press, New York, NY, 1978, pp. 1–45.