

Monitoring Response to Cognitive Behavioral Therapy for Insomnia Delivered via Digital Therapeutic

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People experiencing insomnia have difficulty falling asleep, staying asleep, or both, despite having adequate opportunity to sleep. Insomnia – whether short-term or chronic – is common, with approximately 30% to 40% of adults in the United States reporting insomnia symptoms at some point in a given year.¹ The formal diagnosis of insomnia disorder, as defined by the *DSM-5*, occurs in about 6% to 10% of adults. However, the prevalence is likely higher as people may not report their insomnia symptoms or seek treatment for them.

Insomnia is associated with several medical comorbidities, including restless legs syndrome, chronic pain, gastroesophageal reflux disease, respiratory issues, and immobility.² Approximately 9.5% of adults experience short-term insomnia, which lasts from a few days to a few weeks, but a portion of cases of short-term insomnia will transition to chronic insomnia, which can persist for years.³ Chronic, persistent insomnia can also adversely affect individuals' quality of life, academic performance, risk of motor vehicle accidents, productivity at work, and daytime functioning.⁴

Measuring the Severity of Insomnia

The formal diagnosis of insomnia disorders stems from an individual's dissatisfaction with sleep quantity or quality that has persisted for at least three months.¹ The dissatisfaction is measured according to a person's perception of difficulty falling or staying asleep or early morning awakenings, in the absence of another sleep-wake disorder and not attributable to the physiologic effects of a substance (i.e., drug abuse or medication).

Insomnia is primarily diagnosed by clinical evaluation through a thorough sleep history and detailed medical, substance, and psychiatric history, according to American Academy of Sleep Medicine (AASM) clinical guidelines.⁵ Clinicians may also rely on several instruments to help evaluate and create a differential diagnosis of

insomnia, including sleep logs, symptom checklists, psychological screening tests, and self-administered questionnaires, such as the Insomnia Severity Index (ISI). These tools provide additional information for clinicians to identify which patients require treatment for insomnia, as well as to monitor patients' response to therapy.

Treating Insomnia

According to the American College of Physicians and the American Society of Sleep Medicine, cognitive behavioral therapy for insomnia (CBTi) is the recommended first-line treatment for chronic insomnia, recognized for its ability to help patients recognize and correct the attitudes and behaviors that perpetuate chronic insomnia.^{6,7} Behavioral and psychological treatments for chronic insomnia have been recommended by the AASM for all patient types, including those whose insomnia has not responded to chronic hypnotic medications.

However, CBTi is not accessible to all patients due to the limited number of sleep therapists. Patients may encounter long waiting lists for appointments with sleep therapists who specialize in CBTi, leading them to explore pharmacotherapy options instead. Pharmacotherapy is the most common treatment modality for insomnia, with 4% of U.S. adults taking prescription sleep aids to treat insomnia each year. Approximately one in four patients will continue treatment for four months or longer.⁸ However, the evidence supporting the use of various pharmacologic agents in the treatment of insomnia has been graded as "weak" in various clinical guidelines.⁶

Cognitive Behavioral Therapy for Insomnia

CBTi combines cognitive therapy, stimulus control therapy, and sleep restriction therapy, with or without relaxation therapy.⁹

Accessing CBTi remains a challenge, as people with insomnia may not have a behavioral sleep medicine provider in their geographic area. In recent years, the U.S. Food and Drug Administration (FDA) has focused on the potential for digital health products, including software and mobile apps, to overcome barriers to access and allow patients to access therapy such as CBTi on demand from their personal devices. In March 2020, the FDA authorized Somryst® as the first prescription-only digital therapeutic cleared to treat adults aged 22 years or older with chronic insomnia.¹⁰

Somryst is intended to provide a nine-week course of tailored, algorithm-derived neurobehavioral interventions, specifically CBTi and sleep restriction, to improve the symptoms of insomnia. The FDA submission was supported by data from two randomized controlled trials evaluating the effectiveness of the therapeutic among more than 1,400 adults with chronic insomnia. In the first trial of 303 patients with chronic insomnia,¹¹ treatment with Somryst led to clinically meaningful improvements in insomnia severity, sleep onset latency, and wake after sleep onset, compared with the active control.* In the second study, which included 1,149 adults with chronic insomnia and depressive symptoms, a nine-week

Key Takeaways

- Insomnia disorder occurs in approximately 6% to 10% of American adults.
- The Insomnia Severity Index (ISI) is a validated insomnia measurement that classifies patients into categories of absence of insomnia (or remission) and increasing categories of insomnia severity.
- The American Academy of Sleep Medicine and American College of Physicians recommend cognitive behavioral therapy for insomnia (CBTi) as first-line therapy for chronic insomnia.
- More than one-third of patients with chronic insomnia experience remission following a course of CBTi, when treatment response is measured using the ISI.
- Insomnia has a substantial economic burden through both direct costs, such as office visits and medication costs, and indirect costs, such as absenteeism and work-related accidents.

course of treatment with Somryst resulted in a significant reduction in insomnia severity measurements compared to controls. These benefits persisted for over an 18-month period.*¹²

Somryst is comprised of a patient-facing therapeutic software application, and a clinician-facing dashboard that facilitates health care providers' insight into the patient using Somryst and tracking of patient treatment and progress. It also assists providers in determining response using validated measurements such as the Insomnia Severity Index, the patient's use of the app, and sleep metrics derived from nightly sleep diaries, including SOL and WASO. Here, Charles M. Morin, PhD, the developer of the ISI, speaks about the value of prescription digital therapeutics to provide CBTi and how clinicians can use patient responses on the ISI scale to monitor response to treatment. Versions of the ISI can be completed by either the patient or a clinician, with each version asking the same questions but from a different point of view.

Interview With a Sleep Medicine Specialist



Charles M. Morin, PhD*
*Professor, Department of Psychology
 Director, Centre d'Etude des Troubles
 du Sommeil
 Université Laval
 Quebec City, Québec, Canada*

What is the ISI? What are its primary components?

"The ISI is a validated patient-report scale that is designed to screen for insomnia and also to assess the treatment outcome. It consists of seven items that cover the dimensions of an insomnia disorder according to DSM-5 criteria. Also, because the diagnosis is made based on the patient's subjective complaints, it taps into every critical dimension of measuring insomnia severity.

The seven items include nocturnal insomnia symptoms (difficulty falling asleep, difficulty staying asleep, and problems waking up too early) and the effects or severity of those symptoms (satisfaction or dissatisfaction with sleep patterns, impact of sleep on quality of life, feelings of distress or worry about the sleep problem, and the extent to which the sleep problem interferes with daily functioning).

Patients rate each item on a scale of 1 to 4 (with four indicating greater severity). The scores for each of the seven items are added together to get the total ISI score. An ISI score ranges from 0 (lowest severity) to 28 (highest severity). A score between 0 and 7 indicates no clinical insomnia, a score between 8 and 14 indicates subthreshold insomnia (meaning that an individual presents with clinical symptoms, but the symptom burden does not quite meet the criteria for an insomnia disorder), a score between 15 and 21 indicates moderate insomnia, and a score between 22 and 28 indicates severe insomnia."

How long has the ISI been used in clinical practice?

"The first version was developed in 1993 and the first psychometric data were published in 2001, so it has been used in the field for more than 20 years. It has been translated into more than 50 languages.

At this point, there are probably more than 50 studies that have evaluated the psychometrics of the ISI, and, in general, it has proven to be fairly sensitive and specific. In community samples, most studies have shown that a score of 10 or higher suggests a probable diagnosis of insomnia symptoms and a score of 15 or higher has been well validated as a sign of an insomnia disorder."

How does the ISI compare with other instruments used to evaluate insomnia?

"There are multiple other measures of sleep quality or disturbances, but this is the only measure specifically focused on insomnia and its nocturnal and diurnal components. For example, the Pittsburgh Sleep Quality Index is a well-known measure of sleep quality, but it focuses on measuring sleep quality from a generic sense. The ISI has been well validated and is recognized in the field as the gold standard to capture the severity of insomnia before treatment and to capture changes during treatment."

Is it a tool that can be used by specialists only or can it be used by the primary care clinician as well in the health screening?

"The ISI takes less than five minutes to administer. It can be easily incorporated into larger survey about a patient's health or psychological symptoms. It can be completed by patients or by clinical practitioners and it is widely used in clinical research. The ISI's primary purpose is to assist the clinician in the global assessment of a patient's sleep and to track changes with treatment. A change of seven points or more is defined as a clinically meaningful response to treatment. If the total score is below eight at the end of treatment, the patient's insomnia is considered to be in complete remission.

In that way, it is adaptable to a specific need. For example, it can be completed on a weekly basis, an every-other-week basis, or a monthly basis. The clinical structure of the ISI is typically two weeks; however, a clinician could easily administer it on a weekly basis if that is the frequency of a consultation visit.

The ISI is very useful because of its brevity and ease of use, but we cannot make a diagnosis based solely on a single self-report measure. The diagnosis of insomnia will always remain in the hands of the clinical practitioners."

Could you speak to the value that the ISI offers to providers, to insomnia patients, and to payers?

"With minimal amount of time, the ISI helps the practitioner gauge the level of severity before initiating treatment. It can be repeated throughout treatment to help the clinician place the patient on a continuum of insomnia severity based on the validated cutpoints. It assists clinicians in answering questions such as, 'Well, does this patient need treatment now? Does this patient require additional treatment?'

The ISI has been used to document the cost-effectiveness and perform cost-benefit analyses to gauge the relative cost-effectiveness of cognitive behavioral therapy for insomnia (CBTi) in the context of digital therapeutics, contrasted against a drug therapy.

In terms of benefits, many studies have documented that, for each one- or two-point decrease on the scale, one can expect decreased fatigue or improved energy or cognitive abilities during the day. These are important benefits of using the ISI – for both providers and insurers – because clearly, in terms of health economics, it affects our decision whether to treat insomnia."

How does the value that the ISI offers compare with other specific sleep measures captured in sleep diaries, such as wake time after sleep onset, number of awakenings, or total sleep time?

"One does not preclude the other. A clinician could very well ask a patient to keep a sleep diary along with completing the ISI. The sleep diary provides a different method for measuring a patient's insomnia and is still a useful tool. We would typically ask patients to keep a journal detailing the time they go to bed, the time they get up in the morning, the amount of time required to fall asleep,

if they wake up and how often, etc. These numbers are dependent on the patient's individual perception, so they are not always fully concordant with objective measures of sleep. This information can be combined with the ISI, but, of course, keeping a daily sleep journal is more burdensome for the patient.

The gold standard for measuring sleep-wake disorders is polysomnography, which requires hooking up a patient with electrodes to measure their sleep. As one might imagine, it is more cumbersome and more expensive than completing a self-reported test like the ISI. Not only does the patient have to come in for a night (likely interrupting sleep), but the tracing must be scored by a technician.

Most experts would agree that, given that the diagnosis of insomnia is based on the patient's subjective perception, we should rely on subjective measures which assess perceived severity and treatment outcome."

Can you describe CBTi and how it is delivered?

"CBTi is used in any setting where lifestyles, habits, and beliefs are involved, and it has proved beneficial across the spectrum of mental health disorders, and even for physical health problems such as chronic pain.

When we talk about the CBTi, we are referring to a specific form of psychotherapy focused on sleep. The 'cognitive' piece focuses on changing beliefs and attitudes that may contribute to insomnia, as well as anxiety about sleep and the potential consequences of not sleeping well on daytime functioning. The 'behavioral' piece focuses on sleep scheduling and correcting sleep habits that have come to interfere with the sleep process.

CBTi is brief in the sense that it is implemented over a period of a few weeks and is oriented to solving a specific problem. A psychologist working with CBTi is not looking back in a patient's childhood to find the root cause of insomnia. CBTi addresses the current underlying causes of insomnia, teaching patients about the perpetuating factors of insomnia. For example, if a patient experienced a bout of insomnia, they may want to stay in bed later in the morning or go to bed earlier the next evening to catch up on sleep. These strategies may be helpful in the short term, but in the long run, these become perpetuating factors of insomnia. With CBTi, patients will determine which behaviors to change, how to change their sleep schedule, and how to address thinking patterns that may contribute to or exacerbate their sleep problems. In that sense, it teaches patients how to regain control over their sleep."

How does CBTi compare with pharmacologic interventions for insomnia?

"CBTi is no magic bullet. It requires a good dose of motivation and commitment but works very well if the motivation and commitment are there. Between 70% and 80% of patients will benefit from CBTi, and about 60% will go into full remission with this treatment modality.

This is roughly equivalent to the success rates seen with drug therapy for insomnia, with a slight edge to drug therapy because it can produce results more quickly. With CBTi, though, the clinical improvements are sustained over time. This is the main advantage of this approach, and CBTi is recognized now as a treatment of choice for chronic insomnia disorder."

Describe the differences between CBTi delivered face-to-face and CBTi delivered digitally. Does the increased use of telehealth, particularly in light of the COVID-19 pandemic, increase the value of digital therapeutics for insomnia?

"Digitally delivered CBTi has clear major benefits over traditional face-to-face CBTi in that it is more readily accessible. People can minimize contact with others because it can be performed in one's own home. Also, anecdotally, I have received countless requests to use the ISI scale to tackle sleep or insomnia problems during the COVID-19 pandemic.

The biggest advantage of digital therapeutics is that it reaches a much larger number of people than would be possible through face-to-face therapy. For the most part, insomnia goes untreated, either because people do not know about available treatment options, or the options are unaffordable, or there are no providers with expertise in CBTi in their geographic area."

Are there particular insomnia patient types who would benefit more from digital therapeutics?

"That is a good question and one that is still being explored. Digital therapeutics bypass factors that limit access, but we know that, if patients want to run the program on their own, then, like I said, they'll need a good dose of motivation and commitment.

Thinking realistically, then, CBTi delivered digitally may not be the right choice for someone with insomnia related to major depression because they might need more coaching from a live therapist. Anyone who seems unmotivated to change their sleep behaviors, who has several comorbidities, or who has been using sleeping pills for a long period of time may not be an ideal candidate for this modality. They may derive some benefit but might need more assistance to get their insomnia into remission. Of course, the use of digital therapeutics does not preclude a few consultation visits with a practitioner."

What are the types of digital therapeutic options for CBTi, ranging from a prescription-only therapeutic product like Somryst to other options that are available without a prescription?

"There are different forms of digital therapeutics and some are better than others. Some programs are just a bunch of PDF forms that people read through; others are more interactive and provide individualized learning opportunities.

Several types of sleep apps are available with a great deal of variability across the different products available. To my knowledge, Somryst and Sleepio are the two best-validated digital therapeutics for insomnia currently on the market. There are a number of companies that commercialize products that are not supported by clinical scientific evidence. As clinicians, we must carefully consider these programs before jumping on board.

Somryst is the only digital therapeutic to receive FDA authorization for the treatment of chronic insomnia."

Talking again about the value of these treatment options, what is the value of a prescription-only digital therapeutic such as Somryst to the provider, patient, and insurer?

"A prescription can, on one hand, provide patients with protection in the sense that a patient might present with insomnia symptoms on the surface, but it may actually end up being sleep apnea. So, having a prescription-only therapy like Somryst that incorporates the ISI allows the patient to at least have a brief screening with a clinician, who would determine whether a digital therapeutic is indicated for that particular patient.

On the other hand, some people may see the prescription-only aspect as an unnecessary barrier to access to treatment, but I think it is a small cost to pay to have the assurance that, as

a patient, you are a good candidate for this kind of approach. The patient is not just jumping on the internet and taking the first treatment available, which may not have been validated and which may not be beneficial for your sleep problem.”

How is the ISI used for monitoring response to the prescription plan or CBTi option?

“The ISI is integrated within the Somryst program. Patients who are prescribed the digital therapeutic complete the ISI on a weekly basis throughout the treatment course. Based on their self-reported symptoms, they receive individualized feedback as to where they stand before and after initiating treatment.”

What is your role as a physician or as a key opinion leader in educating payers on digital therapeutics for insomnia? How can you help better inform their approach to covering them moving forward?

“The impact of insomnia has long been underestimated. Now, we have a great deal more data showing that insomnia should not be taken lightly because it often is a chronic, persistent problem. When insomnia persists over time, it tends to increase the risk to develop other issues, such as major depression. Even among people who have never had mental health problems, the presence of persistent insomnia increases the risk of developing depression. There also is an association with hypertension.

We need to provide effective treatment early on to people who develop insomnia disorder. There are alternatives to drug therapies for insomnia. In several clinical practice guidelines published in the last decade, CBTi has always come at the top of those recommendations. CBTi is the treatment of choice, and it has been well validated with the scientific evidence. We should make it available to people who need it. If left untreated, not only will their quality of life decrease, but these people may develop more comorbidity in terms of concomitant medical or psychiatric problems and reduced life expectancy. There also is growing evidence that poor sleep or short sleep may hasten Alzheimer’s disease. We have to take this problem seriously and make effective treatments available.

Digital therapeutics make CBTi accessible to more patients. At first glance, prescribing a digital therapeutic may appear more costly than just prescribing a drug, but we have to take the long-term view. A drug provides short-term benefit, while CBTi, whether it’s delivered face-to-face or digitally, produces long-term benefits. So, clearly, the costs and benefits should be weighed in the balance.”

Disclaimer: The content of this interview represents the opinions of the interviewee and do not represent the official positions of Pear Therapeutics.

** Somryst was tested under the name Sleep Healthy Using the Internet (SHUTi), an early version of Somryst with equivalent content. In clinical studies, Somryst demonstrated persistent results at 6- and 12-month follow-ups. Somryst users may not experience any or all of these benefits.*

† **Charles M. Morin, PhD**, is a professor in the Department of Psychology and director of the Centre d’étude des troubles du sommeil at Université Laval in Quebec City, as well as Canada Research Chair in Sleeping Disorders. Dr. Morin is a consultant for Pear Therapeutics.

References

1. Black DW, Grant JE, eds. DSM-5 Guidebook: The Essential Companion to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Washington, DC: American Psychiatric Association Publishing; 2014.
2. Taylor DJ, Mallory LJ, Lichstein KL, Durrence HH, Riedel BW, Bush AJ. Comorbidity of chronic insomnia with medical problems. *Sleep*. 2007;30(2):213-218.
3. Ellis JG, Perlis ML, Neale LF, Espie CA, Bastien CH. The natural history of insomnia: focus on prevalence and incidence of acute insomnia. *J Psychiatr Res*. 2012;46(10):1278-1285.
4. Olfson M, Wall M, Liu SM, Morin CM, Blanco C. Insomnia and impaired quality of life in the United States. *J Clin Psychiatry*. 2018;79(5):17m12020.
5. Schutte-Rodin S, Broch L, Buysse D, Dorse C, Sateia M. Clinical guideline for the evaluation and management of chronic insomnia in adults. *J Clin Sleep Med*. 2008;4(5):487-504.
6. Edinger JD, Arnedt JT, Bertisch SM, et al. Behavioral and psychological treatments for chronic insomnia disorder in adults: an American Academy of Sleep Medicine clinical practice guideline. *J Clin Sleep Med*. 2021;17(2):255-262.
7. Gaseem A, Kansagara D, Forciea MA, et al. Management of chronic insomnia disorder in adults: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. 2016;165(2):125-133.
8. Chong Y, Fryer CD, Gu Q. Prescription sleep aid use among adults: United States, 2005-2010. *NCHS Data Brief*. 2013;127:1-8.
9. Trauer JM, Qian MY, Doyle JS, Rajaratnam SMW, Cunnington D. Cognitive behavioral therapy for chronic insomnia: a systematic review and meta-analysis. *Ann Intern Med*. 2015;163(3):191-204.
10. Pear Therapeutics. Pear Therapeutics Obtains FDA Authorization for SOMRYST™, a Prescription Digital Therapeutic for the Treatment of Adults with Chronic Insomnia. March 26, 2020. Available at: <https://peartherapeutics.com/pear-therapeutics-obtains-fda-authorization-for-somryst-a-prescription-digital-therapeutic-for-the-treatment-of-adults-with-chronic-insomnia/>.
11. Ritterband LM, Thorndike, FP, Ingersoll, KS, et al. Effect of a Web-Based Cognitive Behavior Therapy for Insomnia Intervention With 1-Year Follow-up: A Randomized Clinical Trial. *JAMA Psychiatry*. 2017;74(1):68-75.
12. Christensen H, Batterham PJ, Gosling JA, et al. Effectiveness of an online insomnia program (SHUTi) for prevention of depressive episodes (the GoodNight Study): a randomised controlled trial. *Lancet Psychiatry*. 2016;3(4):333-341.

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