COMMENTARY

The Promise of Digital CBT-I

Commentary on Lancee et al. Guided online or face-to-face cognitive behavioral treatment for insomnia: a randomized wait-list controlled trial. *SLEEP* 2016;39(1):183–191.

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Empirical support for the effective treatment of insomnia with cognitive behavioral therapy techniques (CBT-I) has grown steadily since the 1960s,[1] and CBT-I is now recognized as a first-line treatment option in insomnia therapeutics.[2] However, its scientific and clinical acceptance has now presented a challenge: the widespread dissemination and implementation of this effective treatment.[3] Of the potential solutions to this problem,[4–7] one of the most promising and least studied is the use of digital, internet-based CBT-I (dCBT-I).[8] The promise of this alternative to standard face-to-face CBT-I is its broad accessibility, high scalability, and relative cost- and time-effectiveness. In order to fully understand the potential advantages and limitations of dCBT-I scalability, trials comparing dCBT-I to traditional approaches must be undertaken; however, there have been no studies to date comparing digital to individual face-to-face CBT-I.

In this issue of *SLEEP*, Lancee and colleagues[9] report outcomes of a randomized controlled non-inferiority trial comparing an online treatment program (dCBT-I) to standard CBT-I (6 weekly, 45 min sessions) and a wait-list control. Participants were 90 (30 per group) individuals with DSM-5 insomnia recruited from a sleep clinic in Amsterdam, the Netherlands. Standard validated efficacy assessment techniques were used, including an online consensus sleep diary completed pretreatment and posttreatment, as well as at 3- and 6-month follow-ups.

Although differences between treatments emerged, dCBT-I and face-to-face CBT-I both significantly improved many aspects of sleep relative to wait list controls, including insomnia severity index scores, sleep efficiency, and total wake time. Where clinical differences between active treatments were seen, face-to-face individual treatment was found to be superior to dCBT-I, a result that is inconsistent with previous findings comparing dCBT-I to group treatment where dCBT-I was found to be non-inferior.[10] The long-term durability of CBT-I is a critical strength, and was evident in the results of Lancee et al. Indeed, posttreatment improvement in insomnia severity was not diminished at any subsequent evaluation. However, compared to dCBT-I, face-to-face treatment produced significantly greater improvement in both insomnia severity and remission rates at 3 and 6 months (Table 4 in Lancee et al.[9]).

Though the advantages of dCBT-I are promising, there are obstacles to be addressed before effective dissemination can be implemented. For example, despite typically large effect sizes for the sleep components listed above, few CBT-I trials, including Lancee have demonstrated significant improvement in total sleep time (TST) following treatment. Considering that the recent consensus regarding 7–8 hours as adequate sleep duration,[11] the posttreatment means of 6.4 and 6.6 h for digital

and face-to-face CBT-I highlight TST as a critical area for improvement in both approaches. Limited generalizability to the larger population of insomnia patients is another issue. As the study was conducted in a sample of patients from a sleep clinic, it is unclear how results would apply to insomnia patients who have limited access to healthcare beyond primary care, and thus the target population for non face-to-face approaches. This calls for additional research that directly targets the larger population of insomnia patients.

A growing consideration in the dissemination of CBT-I is cost.[12] While the authors presume that the dCBT-I approach is more cost-effective, the opposite may currently be true given that few, if any, insurance carriers provide dCBT-I as a benefit, or allow reimbursement for it. Importantly, the results found by Lancee may serve as an impetus to examine the effectiveness of implementing internet-based approaches in the context of today's payer driven health-care system. The financial viability of dCBT-I rests in part on mainstream acceptance of this treatment modality by insurance companies, employer wellness programs, and/ or patients themselves.

Another factor in the widespread acceptance of any CBT-I modality by healthcare providers and the community at large is patient preference. In the study by Lancee, patients indicated a significantly higher preference for traditional CBT-I (77.8%) compared to dCBT-I (52.2%). Similarly, patient adherence to dCBT-I may also be a challenge, as indicated by the 50% completion rate for dCBT-I found in this study. A stepped-care model using both digital and face-to-face CBT-I has been suggested,[13] with access to face-to-face treatment available for complex cases and dCBT-I treatment failures. Future studies could help elucidate underlying moderators of this effect to expand the utilization of dCBT-I.

An important missed opportunity in the study by Lancee was the *specific* assessment of potential adverse aspects associated with CBT-I, such as excessive sleepiness and performance impairments.[14] Such effects are important in the context of any CBT-I treatment modality, but are critical for therapies with sleep restriction, particularly in the context of minimal ongoing supervision by trained sleep specialists.

Behavioral sleep medicine specialists are almost universally invested in increased patient access to CBT-I, with efforts aimed at brief treatments,[5,15,16] dissemination of training to non-specialists,[7] and several other non face-to-face approaches (e.g., phone, video, telehealth).[17] Another important way of emphasizing the value of CBT-I is demonstrating its potential for not only improving sleep health but also for reducing the impact and/ or risk of the mental and physical disorders with recognized links to insomnia.[18] Lancee et al. show that both dCBT-I and face-to-face treatment resulted in improved

anxiety and depressive symptoms, which is consistent with evidence from other dCBT-I[19,20] and face-to face trials.[21] This positive impact on mental health functioning, if replicated in future studies, will be a tremendous benefit to scalable dCBT-I. If similar effects on functioning are found in larger and longer-term randomized controlled trials of dCBT-I, it will likely facilitate integration of this insomnia treatment modality into standard clinical practice.

The implementation of all types of behavioral sleep medicine remains a great challenge for the field, but the study by Lancee may help to push the boundaries of dCBT-I. If integrated with improved access and appropriate triage to behavioral sleep specialists, dCBT-I shows promise as an efficacious and cost-effective treatment for insomnia.

As a field, we must now work to replicate potential differences between digital and in-person delivery of insomnia treatment, to identify mediators of these differences, and, finally, to determine ways to leverage the advantages of each approach while reducing their respective limitations. While future replications are needed, this study is an important contribution to the growing scientific literature on alternative CBT-I approaches (telephone, telehealth, email and video, etc.). Efforts can also be directed to large-scale population-based studies that attempt to prevent and reduce the mental and physical health-related morbidity of insomnia through scalable implementation of behavioral interventions. Research determining if specific patient populations benefit differentially from various CBT-I interventions is also an important goal, and one that may help evolve both digital and face-to-face approaches.

The study by Lancee et al. is a much-needed step in that direction and the authors should be commended for an excellent study which reveals important strengths and limitations to each of these effective approaches to CBT-I treatment. The burden is now on dCBT-I providers to demonstrate efficacy in large effectiveness trials, before widespread implementation can be realized.[22]

CITATION

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REFERENCES

1. Geer JH, Katkin ES. Treatment of insomnia using a variant of systematic desensitization: a case report. J Abnorm Psychol 1966;71:161–4.
2. National Institutes of Health. National Institutes of Health State of the Science Conference statement on Manifestations and Management of Chronic Insomnia in Adults, June 13-15, 2005. Sleep 2005;28:1049–57.
3. Morin CM. Cognitive behavioral therapy for chronic insomnia: state of the science versus current clinical practices. Ann Intern Med 2015;163:236–7.
4. Lovato N, Lack L, Wright H, Kennaway DJ. Evaluation of a brief treatment program of cognitive behavior therapy for insomnia in older adults. Sleep 2014;37:117–26.
5. Buysse DJ, Germain A, Moul DE, et al. Efficacy of brief behavioral treatment for chronic insomnia in older adults. Arch Intern Med 2011;171:887–95.
6. Fuller JM, Wong KK, Hoyos C, Krass I, Saini B. Dispensing good sleep health behaviours not pills - a cluster-randomized controlled trial to test the feasibility and efficacy of pharmacist-provided brief behavioural treatment for insomnia. J Sleep Res 2015 Aug 25. [Epub ahead of print].
7. Karlin BE, Trockel M, Taylor CB, Gimeno J, Manber R. National dissemination of cognitive behavioral therapy for insomnia in veterans: therapist- and patient-level outcomes. J Consult Clin Psychol 2013;81:912–7.
8. Zachariae R, Lyby MS, Ritterband L, O'Toole MS. Efficacy of Internet-delivered cognitive-behavioral therapy for insomnia–a systematic review and meta-analysis of randomized controlled trials. Sleep Med Rev; in press.
9. Lancee J, van Straten A, Morina N, Kaldo V, Kamphuis JH. Guided online or face-to-face cognitive behavioral treatment for insomnia: a randomized wait-list controlled trial. Sleep 2016;39:183–91.
10. Blom K, Tarkian Tillgren H, Wiklund T, et al. Internet-vs. group-delivered cognitive behavior therapy for insomnia: a randomized controlled non-inferiority trial. Behav Res Ther 2015;70:47–55.
11. Watson NF, Badr MS, Belenky G et al. Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society on the recommended amount of sleep for a healthy adult: methodology and discussion. Sleep 2015;38:1161–83.
12. McCrae CS, Bramoweth AD, Williams J, Roth A, Mosti C. Impact of brief cognitive behavioral treatment for insomnia on health care utilization and costs. J Clin Sleep Med 2014;10:127–35.
13. Espie CA. "Stepped care": a health technology solution for delivering cognitive behavioral therapy as a first line insomnia treatment. Sleep 2009;32:1549–58.
14. Kyle SD, Miller CB, Rogers Z, Siriwardena AN, MacMahon KM, Espie CA. Sleep restriction therapy for insomnia is associated with reduced objective total sleep time, increased daytime somnolence, and objectively-impaired vigilance: implications for the clinical management of insomnia disorder. Sleep 2014;37:229–37
15. Ellis JG, Cushing T, Germain A. Treating acute insomnia: a randomized controlled trial of a "single-shot" of cognitive behavioral therapy for insomnia. Sleep 2015;38:971–8.
16. Bothelius K, Kyhle K, Espie CA, Broman JE. Manual-guided cognitive-behavioural therapy for insomnia delivered by ordinary primary care personnel in general medical practice: a randomized controlled effectiveness trial. J Sleep Res 2013;22:688–96.
17. Ho FY, Chung KF, Yeung WF, et al. Self-help cognitive-behavioral therapy for insomnia: a meta-analysis of randomized controlled trials. Sleep Med Rev 2015;19:17–28.
18. Vgontzas AN, Fernandez-Mendoza J, Liao D, Bixler EO. Insomnia with objective short sleep duration: the most biologically severe phenotype of the disorder. Sleep Med Rev 2013;17:241–54.
19. Espie CA, Kyle SD, Williams C, et al. A randomized, placebo-controlled trial of online cognitive behavioral therapy for chronic insomnia disorder delivered via an automated media-rich web application. Sleep 2012;35:769–81.
20. Pillai V, Anderson JR, Cheng P, Bazan L. The anxiolytic effects of cognitive behavior therapy for insomnia: preliminary results from a web-delivered protocol. J Sleep Med Disord 2015;2:1017.
21. Manber R, Bernert RA, Suh S, Nowakowski S, Siebern AT, Ong JC. CBT for insomnia in patients with high and low depressive symptom severity: adherence and clinical outcomes. J Clin Sleep Med 2011;7:645.
22. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci 2009;4:50.

DISCLOSURE STATEMENT

Dr. Drake has indicated no financial conflicts of interest.