

The Further Rise of Internet Interventions

Commentary on Espie 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;35:769-781.

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The paper published by Dr. Espie and colleagues¹ in this issue of *SLEEP* presents one of the most rigorous trials to date evaluating a widely accessible treatment for insomnia: Internet-delivered cognitive behavioral therapy for insomnia (CBT-I). There is strong evidence for the effectiveness of clinician-delivered CBT-I.^{2,3} However, there are a number of issues that have severely limited availability to this highly effective intervention, arguably none more important than a lack of skilled clinicians to provide it.⁴ A relatively new and innovative approach to overcoming treatment access barriers is to utilize the Internet as a mechanism for delivering interventions and related health services. The report by Espie et al.¹ presents further and compelling evidence of the efficacy of delivering a fully automated CBT-I intervention via the Internet.

This article not only makes an important contribution to the Sleep field, but also adds to the ever-growing field of eHealth⁵ generally, and Internet interventions, specifically. As Dr. Espie and colleagues note, there have been a number of publications demonstrating the potential of using the Internet to deliver CBT-I,⁶⁻⁸ but their trial adds to that literature in a number of ways, including the exceptional use of a strong placebo control group and relatively large sample size to ensure an adequately powered trial.

The Internet intervention evaluated in the trial of Espie et al. is called Sleepio. Internet interventions are typically behaviorally or mental health based treatments and prevention programs that have been operationalized for web-delivery.⁹ By utilizing the capabilities of web-based technology, the interventions can be engaging, interactive, and tailored. In addition, they can be supported on a continuum from heavy human involvement to fully automated systems. This issue of support is a controversial one in the field. There are data backing the idea that human support is an important, perhaps even necessary, element of effective Internet interventions. However, these assumptions have been made based on studies that have mostly focused on mental health interventions for depression and anxiety.¹⁰ In contrast, other studies have achieved significant and impressive outcomes with no human support.^{6,11} The trial by Espie and colleagues is a prime example of achieving large treatment effects without clinician support. As such, it adds weight to the argument favoring fully automated interventions.

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It may never be possible, however, to determine the ideal level of human support necessary to achieve optimal outcomes, because of the heterogeneity of target populations, diseases/disorders, foci, and intervention characteristics (e.g., program appearance, see Ritterband et al.¹² for Website Characteristics as part of the Internet Intervention Model). It is on this last component—intervention characteristics—where Sleepio resources appear to have been prioritized, making the program characteristics visually appealing, personalized, tailored, and engaging. Perhaps these intervention elements heavily influence the outcome of an intervention; or maybe it is these elements that help overcome the need for human support. The likely importance of these elements to treatment efficacy suggests the need to create robust Internet interventions that take full advantage of the multimedia elements of the Web. However, it is important to understand that this type of program—fully automated, tailored to the individual user, visually appealing—comes at a cost. Programs such as these are difficult and expensive to build, requiring time to plan, create, debug, implement, and maintain. The payoff, though, may be significantly improved interventions that require fewer human resources once implemented. Although there can be substantial costs (e.g., programming) to developing a robust automated Internet intervention, there are also costs to implementing a human supported Internet intervention. However, the advantage of a fully automated intervention like Sleepio is scalability. Once the intervention is built, the added cost of including another patient or participant is relatively negligible.¹³ But, if the intervention requires human support, the cost of greater dissemination can be significant, if not prohibitive.

It may be, though, that this question of “which is better” is not the right question. Perhaps the question to consider is: “How can beneficial health care best be provided to the greatest number of people?” Different people will require different treatment approaches, and the more options that are available, particularly those that can be made widely available, the greater likelihood that those seeking help can obtain it. Low intensity self-help options such as Sleepio make it much more likely for those with insomnia to actually receive help. While clearly not everyone will be helped by a web-based self-administered CBT program, given the apparent success of Sleepio¹ and of Internet interventions broadly,¹⁴ this type of approach may be able to help a vast number of people world-wide. Furthermore, if or when it becomes possible to determine which users are best served by which types of interventions, even greater resources can be saved by correctly allocating at the outset the most appropriate intervention.

It is important to note that there are trade-offs to several of the strengths of this study by Espie et al.¹ Sleepio incorporates a community forum allowing participants to connect as part of

a moderated social network. While this is an attempt to incorporate technology that is already frequently utilized, it complicates the results. From the reported findings, it is not clear to what extent this tool was used. Further, it is not known whether this tool was responsible for any of the observed sleep improvement. If participation in the forum did contribute to sleep improvements, questions about efficacy are then raised for future Sleepio users who use the program during a period of limited social network activity. There is also an unspecified cost related to the support required to moderate such a forum.

Another strength of the study by Espie et al. was limiting interaction with participants to reduce expectancy effects and better mimic how the program would be used in the real world. However, this comes at the expense of the omission of a clinical interview to formally diagnose participants with insomnia. That said, Sleepio clearly reduced sleep complaints among those who self-referred for insomnia, which is likely how the program would be used in the real world.

Lastly, given ethical constraints and a desire to make the intervention available to control condition participants, long-term follow-up was not conducted. This makes it difficult to determine whether treatment gains were maintained over time and whether improvements might have been seen in the TAU group over time.

Important issues within Internet interventions, including dissemination and access, quality and robustness, and cost and cost-benefit, are all raised by Espie et al. but not addressed in it. These are critical issues, and the future of Internet interventions depends on how these are answered. It is important that these questions be tackled as part of evaluating the science of Internet interventions.^{12,15} It is these research inquiries that separate evidence-based programs, like Sleepio, from programs that are made commercially available without an evidence base to support their efficacy. To truly make an impact on a public health level, the focus must be on providing patients with widely available, research-backed programs, proven to reduce symptoms and improve functioning. Sleepio clearly adds to the literature and helps further push the fields of Sleep and eHealth in critical and important ways.

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DISCLOSURE STATEMENT

Drs. Ritterband and Thorndike are equity holders of BeHeath Solutions, Inc., which is developing products related to the research in this commentary.

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