



Original Article

Web- vs telehealth-based delivery of cognitive behavioral therapy for insomnia: a randomized controlled trial



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ABSTRACT

Objectives: The purpose of our study was to evaluate and compare two methods of service delivery (web-based and telehealth-based) for chronic insomnia with regard to patient preference, clinical effectiveness, and patient satisfaction.

Methods: Our study was a randomized controlled trial with manualized telehealth- and web-based delivery conditions (nonblinded). The sample comprised 73 adults with chronic insomnia. Participants received web-based delivery from their homes or telehealth-based delivery from a nearby clinic. Both interventions consisted of identical psychoeducation, sleep hygiene and stimulus control instruction, sleep restriction treatment, relaxation training, cognitive therapy, mindfulness meditation, and medication-tapering assistance.

Results: Using a linear mixed model analysis, results showed that both delivery methods produced equivalent changes in insomnia severity, with large effect sizes. Attendance patterns favored telehealth, whereas homework adherence and preference data favored web-based delivery.

Conclusions: Web- and telehealth-based delivery are both helpful in treating chronic insomnia in rural-dwelling adults.

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1. Introduction

Partly to address the rising costs of healthcare and to combine empirically supported treatments with cost-effective service delivery, there has been a trend in recent years to develop innovative treatments for insomnia. Some of these innovative treatments include the use of bibliotherapy (e.g., reading material), audiotapes, and telephone consultation, as well as more recently web- and telehealth-based treatment. In addition to increasing therapeutic efficiency and providing more choices to healthcare consumers, these technologies have the potential to increase access to services for individuals in rural regions who are unable to attend in-person treatment sessions.

Videoconferencing technology (i.e., telehealth) is increasingly being used in Canada to increase access to services for individuals in rural and remote regions. In our region, approximately 30% of patients must travel to the clinic to receive specialist care. Telehealth was designed to help reduce healthcare costs for consumers associated with travel and to improve equitable access to services that are otherwise not available in rural and remote communities.

It most typically is provided over a secured network (telehealth), which links hospitals and clinics in different regions to one another. Videoconferencing technology has many advantages over other technologies (e.g., telephone consultation) in that it enables therapists and patients to see one another and communicate verbally and nonverbally in real time. Therapists also can demonstrate techniques (e.g., paced breathing) to patients, and participants can benefit from interaction with a therapist and even with a treatment group. In our region, satisfaction with telehealth services is high.

Research in other settings has demonstrated that psychologic interventions can be effectively delivered via telehealth with benefits similar to in-person delivery of services for a range of concerns, including pain management [1], panic disorder, agoraphobia [2], and posttraumatic stress disorder [3]. Although somewhat surprising, several studies in the field have reported high ratings of therapeutic alliance for cognitive behavioral therapy (CBT) delivered using telehealth [2,4]. As this literature indicates telehealth is a promising technology, but research typically has used small samples and has not used random assignment to conditions, which limits the interpretation of the findings. To date, there are no empirical data evaluating the use of telehealth for the treatment of chronic insomnia.

Paralleling these developments is evidence that CBT for insomnia (CBT-I) delivered via the Internet can be effective [5–9].

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Research shows that web-based programs improve sleep quality (SQ), daytime fatigue, and overall severity of insomnia relative to nontreatment control groups [7,9]; however, many of such interventions have yet to be compared to active treatments.

Although telehealth is associated with greater ongoing costs to the healthcare system than a web-based treatment service, it likely has some advantages over web-based treatment due to the greater opportunity for discussion, alliance building, group interaction, and personal feedback. Indeed research shows that limited but prompt therapist assistance reduces attrition and maximizes outcome for some types of self-help treatments (e.g., bibliotherapy) of insomnia [10,11]. This finding converges with a growing body of research demonstrating that weekly therapist support as an adjunct to structured web-based CBT enhances treatment adherence and outcome; however, programs without formal support have highly variable but typically lower completion and success rates [12,13].

1.1. Study rationale

To summarize, insomnia is a pervasive problem which is associated with notable concerns of the individual and considerable cost to the healthcare system. CBT-I is a popular and effective treatment of chronic insomnia; however, individuals in rural communities have limited access to this service. The purpose of our study was to evaluate and compare 2 methods of service delivery (web-based and telehealth-based) for CBT-I with regard to patient preference, clinical effectiveness, and patient satisfaction. We also hypothesized that participants in the telehealth condition who engaged weekly with the therapist and other group members would report higher rates of adherence, greater improvements in sleep, and a higher degree of satisfaction with treatment than those in the unsupported web-based condition, due to the enhanced therapist contact. However, because several factors other than support are known to influence engagement, adherence, and attrition in web-based treatment (i.e., program design and structure, credibility, expectations) [12], we opted to conduct a 2-tailed analysis that would allow us to examine a greater range of possibilities, including the possibility that web-based treatment would outperform telehealth.

2. Methods

2.1. Design

Our study was a 2-group (telehealth- and web-based), randomized, controlled trial. A treatment integrity check was conducted by asking for the submission of weekly adherence data. Each week a series of questions were asked pertaining to the frequency of completion of various homework assignments. As a secondary analysis, we also included an in-person comparison group, consisting of individuals participating in the same group intervention as those participating via teleconferencing.

2.2. Participants

Participants comprised 73 adults living in a rural Canadian province. Inclusion criteria for the study were access to high speed Internet and a home computer; a disturbance of sleep consisting of a delay in sleep onset, return to sleep, or early morning awakening of >30 min; a report of at least one symptom of daytime impairment (e.g., fatigue, lack of concentration); and insomnia lasting at least 6 months, occurring on at least 4 nights per week. There was no maximum allowable total sleep time (TST) (e.g., 6.5 h) for inclusion in the study. The inclusion criteria were consistent with the general research diagnostic criteria for insomnia disorder

[14]. If a comorbid sleep or psychiatric disorder was present, treatment of this condition was stable at the time of entry in the study. The former was assessed using a self-report sleep interview and prior physician assessment, as indicated on the letter of referral. A portion of the participants had undergone PSG assessment. These assessments were not undertaken if the treating physician felt that they were not necessary, because symptoms were inconsistent with possible apnea, narcolepsy, restless legs syndrome, or periodic limb movements. All participants who were diagnosed with sleep disorders other than insomnia were receiving therapy for those conditions. We did not require that medications be stable. Exclusion criteria for the study were the presence of shift work, head injury, acute suicidality, current mania, schizophrenia, current or past CBT-I, or elevated substance use. Elevated substance use was defined as consuming >14 alcoholic beverages per week for men or >12 alcoholic beverages per week for women.

A description of participant characteristics is found in Table 1. Using χ^2 analyses, there were no significant differences between the 2 groups on any dimension. Of the sample, 57.5% ($n = 42$) were using a sedating medicine for sleep. There were no participants taking antipsychotic agents. No information was collected regarding participant ethnicity or income. The native language of all participants was English. There were no participants in the study who had received previous CBT-I or were receiving concurrent CBT-I.

A group of urban in-person individuals who participated in the telehealth groups at the host urban site are presented for purposes of comparison. The in-person sample ($n = 34$) was referred by the physician and comprised mostly women (67.6%; $n = 23$) who were married (58.8%; $n = 20$) and employed (70.6%; $n = 24$), with a post-secondary education (88.2%; $n = 30$). Of this in-person sample, 38.2% ($n = 13$) had a comorbid psychiatric condition.

2.3. Primary end point measures

The primary end point was insomnia severity as measured using the Insomnia Severity Index (ISI) [15]. The ISI is a 6-item self-report measure of impairment in daytime functioning due to inadequate sleep. The ISI shows adequate internal consistency, appropriate test-retest reliability, and sensitivity to change with treatment [16]. Scores can range from 0 to 28, with higher scores indicating more impairment. Scores higher than 14 are thought to be indicative of the presence of clinical insomnia and change in scores of -8.4 have been found to reflect moderate improvement in clinical samples [17].

2.4. Secondary end point measures

Secondary end point measures included nocturnal self-reported sleep, daytime fatigue, dysfunctional beliefs about sleep, and work and social adjustment. A standard sleep diary [15] measured information regarding TST, sleep-onset latency (SOL), sleep efficiency (SE), number of night awakenings (NWA), time awake in the night (WASO), SQ, and frequency of use of sleep medications. It is recognized that relying on self-reported symptoms to assess sleep is not free of error; however, data obtained from sleep diaries correlate highly with data obtained from PSG [18,19]. They also capture the subjective complaint component of insomnia, which is crucial in patients' decisions to seek treatment, and is a cost-effective alternative to PSG assessment. Additionally, PSG also is not an error-free assessment method, as there is high night-to-night variability and PSG recording occurs in an artificial environment.

2.4.1. The Multidimensional Fatigue Inventory

The Multidimensional Fatigue Inventory (MFI-20) [20] measured daytime fatigue. The MFI-20 is a 20-item self-report measure

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