



## Research report

## Insomnia before and after treatment for anxiety and depression

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## ABSTRACT

**Background:** Insomnia increases the likelihood of developing a mood or anxiety disorder. Moreover, symptoms of anxiety and depression, such as worry and rumination, contribute to insomnia. Given these relationships, there is a need to delineate how these disorders respond to treatment when they are comorbid.

**Methods:** 266 individuals presenting for anxiety and/or depression symptoms participated in this study in which symptoms of insomnia, anxiety, depression, disability, and sleep length were assessed. 102 of these patients were treated with internet-based cognitive behavioral therapy (iCBT) for anxiety and/or depression and 61 completed the treatment. Pre- to post-treatment symptom changes were examined in this subset.

**Results:** Insomnia, as measured by the Insomnia Severity Index, was evident in 40% of the patients. Individuals with insomnia reported more severe symptoms of anxiety and depression than individuals without insomnia. iCBT focused on anxiety and/or depression was associated with reductions in symptoms of insomnia, anxiety, depression, and disability. Total sleep time did not change over treatment.

**Limitations:** As the data were collected in routine care, there was no control group and no longer term follow-up assessment.

**Conclusions:** These findings highlight the importance of insomnia across anxiety and depressive disorders. They further demonstrate that treatment for anxiety and/or depression appears to improve comorbid insomnia symptoms, though may be ineffective in changing sleep duration.

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## 1. Introduction

Insomnia frequently co-occurs with both anxiety disorders (Harvey et al., 2009; Papadimitriou and Linkowski, 2005) and depression (Ford and Kamerow, 1989; Peterson et al., 2008). By itself, insomnia is a major public health problem associated with decreases in functioning, increased days off work, and greater use of healthcare services (Roth et al., 2006; Yu Sun et al., 2012). The prevalence of insomnia in the general population is as high as 22%, though it is typically estimated to be between 6–15% (Ohayon, 1997, 2002; Roth et al., 2011). Anxiety disorders and depression are also highly prevalent and negatively affect relationships, limit educational attainments, contribute to difficulties at work, and impair one's physical health (Hansson, 2002; Rapaport et al., 2005; Sanderson and Andrews, 2002). The 12-month prevalence of depression (Major Depressive Disorder or Dysthymia) is 8% and of an anxiety disorder is 18% (Kessler et al., 2005). Moreover,

insomnia comorbid with anxiety or depression gives rise to more complications and greater burden than does each disorder alone (for review, see Belleville et al., 2011).

Importantly, the relationships between insomnia and anxiety and insomnia and depression appear to be bidirectional in that insomnia contributes to symptoms of anxiety and depression, and conversely, symptoms of anxiety and depression disrupt sleep (Baglioni et al., 2011; Baglioni et al., 2010; Harvey, 2008; Jansson-Frojmark and Lindblom, 2008; Sivertsen et al., 2012). The bidirectional nature of these relationships raises the hypothesis that reducing symptoms of depression or anxiety, would also reduce symptoms of insomnia, and that reducing symptoms of insomnia, would also reduce symptoms of anxiety and depression.

In a meta-analysis of 1205 CBT trials for anxiety disorders, 25 assessed the impact of treatment on associated sleep problems (Belleville et al., 2010). The results suggested that CBT for anxiety has a moderate effect on sleep (Belleville et al., 2010). However, it was concluded that due to potential publication biases and the small number of previous studies, the impact of CBT for anxiety

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disorders on comorbid insomnia remains unknown (Belleville et al., 2010). The authors also noted that despite the sizeable amount of research which demonstrates that individuals with anxiety disorders frequently report problems with sleep, there is little in the way of empirical evidence to guide clinicians in effectively targeting comorbid anxiety and sleep problems, suggesting that more research is required.

In terms of the treatment of comorbid depression and insomnia, Manber et al. (2008) found that the addition of cognitive behavioral therapy for insomnia (CBT-I) to antidepressant medication treatment for individuals with comorbid depression and insomnia led to better treatment outcomes for both disorders as compared to antidepressant medication plus a control sleep intervention. This is an important finding given that a reasonable subset of patients continue to experience residual symptoms of insomnia following both successful pharmacotherapy and CBT for depression (Carney et al., 2007). Whilst the finding that a subset of patients continue to experience residual symptoms of insomnia appears to be a robust observation following pharmacotherapy (Iovieno et al., 2011; Nierenberg et al., 1999), to the best of our knowledge, it has only been investigated once in the context of CBT for depression (Carney et al., 2007), and thus requires further examination.

### 1.1. The current study

In the present study, insomnia, anxiety, depression, disability, and sleep length were assessed in a group of 266 patients presenting for treatment at a specialist anxiety disorders clinic. One hundred and two of these patients were treated for anxiety and/or depression using internet-based cognitive behavioral therapy (iCBT). The first aim was to examine the proportion of insomnia among individuals seeking treatment for anxiety and depression and to compare those with and without insomnia on symptoms of anxiety, depression, and disability. It was hypothesized that a high proportion of patients with anxiety and/or depression would report comorbid symptoms of insomnia and that individuals with insomnia would report more severe symptoms of anxiety, depression, and disability than individuals without insomnia. We also sought to compare levels of insomnia across anxiety disorders and depression. The second aim was to investigate whether treatment for anxiety and/or depression would reduce comorbid symptoms of insomnia. It was hypothesized that iCBT for anxiety and/or depression would result in improvements in anxiety, depression, and insomnia. We also examined the presence of residual insomnia symptoms in patients who achieved remission from their anxiety and/or depression.

## 2. Method

### 2.1. Participants

Participants assessed at baseline were 266 patients presenting for treatment at a specialist anxiety and depression disorders clinic at the Clinical Research Unit for Anxiety and Depression (CRUFAD) at St Vincent's Hospital in Sydney, Australia. Patients were recruited from December, 2010 to November, 2011. One hundred and two of these patients were offered an iCBT program for their presenting disorder. Fig. 1 shows patient selection and flow. Only patients who met criteria for an anxiety disorder or major depressive disorder or dysthymia, for which we had an internet course, were offered iCBT. Patients with psychosis, bipolar disorder, or substance abuse/dependence, as well as patients who were taking benzodiazepines or were currently suicidal were excluded from treatment. The primary reasons for offering face-to-face treatment over iCBT included a diagnosis of obsessive

compulsive disorder or health anxiety (as we did not have online treatments for these disorders at the time of the study), poor computer literacy skills, no access to the Internet, or if clinically indicated due to suicide risk (as assessed by the PHQ-9 suicide item and clinical interview).

### 2.2. Measures

Patients completed the battery of self-report questionnaires listed below before and after treatment. Generalized Anxiety Disorder (GAD) was assessed by the *Generalized Anxiety Disorder Scale-7* (GAD-7; Spitzer et al., 2006). A score of 10 or higher indicates clinical levels of GAD. Panic Disorder with or without Agoraphobia was assessed by the 7-item *Panic Disorder Symptom Scale, Self Report form* (PDSS-SR; Houck et al., 2002). A score of 9 or higher indicates a score in the clinical range. Social Anxiety Disorder was assessed by the *Mini-Social Phobia Inventory* (Mini-SPIN; Connor et al., 2001). Clinical social anxiety is indicated by a score of 6 or above. Depression was assessed by the *Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2001). A score of 10 or higher indicates clinically significant levels of depression. Insomnia severity was measured by the *Insomnia Severity Index* (ISI; Bastien et al., 2001), by which clinical insomnia is indicated by a score of 15 or above. Sleep length was measured by a sleep record, which patients completed once by providing retrospective estimates of their usual sleep habits during the past 2 weeks. The items in the sleep record were generally consistent with those outlined in Carney et al.'s, (2012) core sleep diary, and allowed the sleep parameters highlighted by Buysse et al. (2006) to be calculated. Disability was assessed by the *World Health Organization Disability Assessment Schedule II* (WHODAS-II; Andrews et al., 2009). Higher scores indicate higher functional impairment.

### 2.3. Procedure

#### 2.3.1. Assessment

Patients were referred by their doctor (General Practitioner, Psychiatrist, or Primary Health Care Physician) for assessment at CRUFAD. All patients gave consent for the use of their questionnaire results to be used for research purposes. Patients arrived at the clinic and completed the questionnaire battery on a computer. They were then seen by a Psychiatrist for a clinical interview to determine their primary diagnosis (defined as the chief mental health condition the patient presented with) and treatment options. Patients who completed an iCBT course, were re-administered the questionnaires online immediately following their final lesson.

#### 2.3.2. Treatment

Patients who were deemed to be suitable candidates for CBT for anxiety and/or depression were offered iCBT in the first instance (within a stepped-care model). Patients who were accepted for iCBT were enrolled immediately. The course cost patients \$44AUD. Patients were assigned to one of the following five courses based on their primary diagnosis – Depression; Panic Disorder with or without Agoraphobia; Generalized Anxiety Disorder; Social Anxiety Disorder; or the Mixed Anxiety and Depression course. These courses have been extensively studied and shown to be effective in the treatment of anxiety and depression (for a meta-analysis, see Andrews et al., 2010). Courses varied in length, consisting of 5 or 6 lessons. Each lesson comprised a comic involving a character with the relevant diagnosis who learns about their disorder and the CBT skills required to manage their symptoms. Patients downloaded a homework summary each lesson, which consists of psychoeducation and various exercises such as cognitive restructuring and developing an exposure hierarchy. Patients were

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