Meta-analytic review of the impact of cognitive-behavior therapy for insomnia on concomitant anxiety

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CRD summary
The review concluded that available data suggested that cognitive-behavioural therapy for insomnia had a positive moderate impact on associated anxiety, but the magnitude of effects may be overestimated by the inclusion of findings from less rigorous studies. Potential for biases and the uncertain quality of the included studies limit the reliability of the pooled results.

Authors' objectives
To assess the impact of cognitive-behavioural therapy for insomnia (CBT-I) on associated anxiety.

Searching
MEDLINE, PsycINFO and ProQuest were searched between 1980 and 2009 for articles published in English or French. Search terms were reported. Reference lists of included studies and seven systematic reviews were searched.

Study selection
Studies in adults diagnosed with primary or secondary insomnia, undiagnosed sleep problems or reported poor sleep quality were eligible for inclusion. At least one group had to receive a psychological treatment with a behavioural or cognitive component and the study had to report treatment outcomes. Studies that did not report anxiety data, did not provide sufficient data to calculate effect sizes or that reported non-quantitative data were excluded.

The included studies considered various behavioural, cognitive or psychological treatments (some included anxiety management strategies) that included relaxation, sleep hygiene education and cognitive therapy in participants with primary insomnia, secondary insomnia, other sleep difficulties and post-traumatic stress disorder. A wide variety of questionnaires was used to measure anxiety constructs. Anxiety constructs included anxiety, arousal, worry and stress. The number of treatment sessions varied from zero to 22. Total duration of therapy varied from 15 to 1,560 minutes, where reported. Treatment delivery varied from group to individual to remote; some studies used a manual and some did not. Some studies included controls; others were pre-post studies. Most studies did not address anxiety. Where reported, the mean age of participants ranged from 20.59 to 80.63 years. Some studies included participants with comorbidities that ranged from alcohol abuse to cancer.

The authors did not state how many reviewers performed study selection.

Assessment of study quality
The authors did not state whether or not they performed formal validity assessment, although they discussed randomisation and use of a control group.

Data extraction
Data were extracted on anxiety-related variables and used to calculate effect sizes (Hedge's g), together with 95% confidence intervals (CIs). Data from comparative studies were used to calculate between-group effect sizes. Data from pre-post studies were used to calculate within-group effect sizes. At least two reviewers independently performed data extraction and the inter-rater agreement statistic was calculated.

Methods of synthesis
A random-effect meta-analysis was used to calculate pooled effect sizes (Hedge’s g), together with 95% CIs. Statistical heterogeneity was assessed using the Cochran Q statistic and I². Publication bias was assessed using funnel plots and the Orwin fail-safe N value. Subgroup analysis was conducted on the basis of treatment, participant and study characteristics.

Results of the review
Fifty studies (2,690 participants) were included in the review. Twenty studies used a control group and 28 studies were randomised. The number of participants ranged from seven to 247. Loss to follow-up ranged from zero to 46.94%.

The overall effect size was 0.406 (95% CI 0.318 to 0.493, $I^2=63\%$), which suggested a significant small to moderate effect of CBT-I on anxiety.

Subgroup analyses showed no significant differences except that studies which used hypnotic withdrawal (three studies) tended to have a smaller effect size than those that did not (48 studies); this may be explained by the small number of studies that used hypnotic withdrawal. There was no significant heterogeneity between groups in terms of anxiety constructs, but there was significant heterogeneity in terms of questionnaire choice ($I^2=70\%$).

The funnel plots were reported to be almost symmetrical and Orwin's fail-safe N value was 46, which indicated that the results of the review were not limited by significant publication bias.

**Authors' conclusions**

Available data suggested that CBT-I had a positive moderate impact on associated anxiety; however, the magnitude of effects may have been overestimated by the inclusion of findings from less rigorous studies.

**CRD commentary**

Inclusion criteria for the review were clearly defined. Several relevant data sources were searched. There was potential for language bias as only articles published in English or French were included. Publication bias was assessed and not detected. Attempts were made to reduce reviewer error and bias during data extraction; the authors did not state whether the same methods were used for study selection. The authors did not state that they undertook formal quality assessment. Fewer than half of the trials used a control group and more than one third did not randomly assign participants to groups. Anxiety was addressed in only a small number of studies There were differences across studies in the type of measurement tools used. Trials were combined using appropriate statistical methods and statistical heterogeneity was assessed; there was evidence of statistical heterogeneity in several of the analyses.

Potential for biases and the uncertain quality of the included studies limit the reliability of the pooled results.

**Implications of the review for practice and research**

**Practice:** The authors stated that clinicians should conduct a careful assessment of residual anxiety following CBT-I. Clinicians should consider what the patient's priority is if they present with comorbid anxiety and insomnia, and treat accordingly.

**Research:** The authors stated a need for further research to more clearly identify the most clinically useful instruments for assessing anxiety in trials of CBT-I. Efforts should be made to include control groups in trials of CBT-I. The theory that patients with insomnia develop sleep-related behaviours that contribute to anxiety should be tested. The benefits of adding anxiety management strategies to CBT-I in individuals with or without comorbid anxiety problems should be explored. Research should be conducted on clinicians' decisions to treat one or both disorders and the subsequent outcomes.

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