A systematic review and meta-analysis of randomized controlled trials of cognitive-behavioral therapy for tinnitus distress

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CRD summary
This review found evidence that suggested cognitive behavioural therapy was an effective treatment for adults with tinnitus distress. The authors noted that caution was warranted given that few large-scale well-controlled trials were identified. These cautious conclusions reflected the limitations of the evidence presented and are likely to be reliable.

Authors' objectives
To determine the effect of cognitive-behaviour therapy (CBT) in adults with tinnitus-related distress.

Searching
PubMed, PsycINFO and The Cochrane Library were searched to September 2009 for articles in any language; search terms were reported. Reference lists of retrieved articles, previous reviews and meta-analyses were scanned for additional studies. Relevant conference proceedings, databases of unpublished theses and registered ongoing trials were handsearched. Experts in the field were contacted for unpublished material.

Study selection
Randomised controlled trials (RCTs) that assessed the efficacy of CBT compared to a control group for adults with tinnitus-related distress were eligible for inclusion. The primary outcome was change in tinnitus-related distress. A secondary outcome was mood. Comparison groups could include no treatment, treatment as usual or another form of treatment. Eligible studies had to report sufficient data to evaluate efficacy of CBT.

The included studies were conducted in Germany, Sweden and Australia. CBT treatment varied between studies and included cognitive and behavioural methods individually or combined. Control groups included waiting list, tinnitus education or information, sound therapy or training and yoga or relaxation training. Treatment was conducted using either group or individual therapy or via telephone or internet. The number and duration of treatment sessions varied. Outcomes were measured using a variety of tools. Age of participants ranged from 45 to 70 years old. The proportion of males ranged from 13% to 52%. Participants had experienced tinnitus from five to 13 years.

Two reviewers independently selected studies for inclusion. Disagreements were resolved through consensus.

Assessment of study quality
Study quality was assessed using the Clinical Trial Assessment Measure by Tarrier and Wykes. Criteria included assessment of study sample, randomisation, blinding, attrition, measurement of outcomes and analysis (maximum score 100).

Two reviewers independently assessed study quality.

Data extraction
Data were extracted for tinnitus distress and mood outcomes to enable calculation of effect sizes using methods by Hedges’ g (standardised mean difference). Where studies included more than one control comparison, separate effect sizes were calculated where control conditions were deemed different. Where multiple control conditions or different forms of CBT within a study were similar, effect sizes were averaged across comparison groups. Authors were contacted for additional information where necessary.

The authors did not state how many reviewers extracted data.

Methods of synthesis
Pooled mean effect sizes (Hedges’ g) were calculated using a fixed-effect model and a random-effects model. Heterogeneity was assessed using Q and I² statistics. A meta-regression was conducted to assess the effect on results of
methodological quality and format of intervention. Sensitivity analyses were conducted to examine the influence of different methods of calculating effect sizes as well as different outcome measures used and the impact of outliers. To evaluate the long-term effects of CBT, a standardised gain score (effect size from baseline to follow-up) was calculated for tinnitus outcome measures for participants randomised to CBT only. Publication bias was assessed using visual inspection of funnel plots and by Duval and Tweedie’s trim and fill method.

Results of the review
Fifteen RCTs (1,091 participants, range 23 to 130) were included in the meta-analysis. Study quality scores ranged from 18 to 62 (mean 38.4). No studies were judged to be of high quality (>65 points). No studies reported using independent blind assessors to evaluate outcomes. Drop-outs ranged from zero to 49%.

CBT compared with passive control groups: There was a statistically significant moderate to large improvement for CBT compared with a waiting-list control for primary tinnitus distress measures (Hedges’ g 0.70, 95% CI 0.56 to 0.84, fixed-effect model) and for mood measures (Hedges’ g 0.35, 95% CI 0.21 to 0.50, fixed-effect model). Results using a random-effects model were similar. There was evidence of statistical heterogeneity for both analyses (I²=26% and I²=40%).

CBT compared with active control groups: There was a statistically significant small to moderate improvement for CBT for tinnitus distress measures (Hedges’ g 0.44, 95% CI 0.16 to 0.72, fixed-effect model) and for mood measures (Hedges’ g 0.42, 95% CI 0.09 to 0.74, fixed-effect model). Results were similar using a random-effects model for tinnitus measures but became non-significant for mood measures. There was no evidence of statistical heterogeneity for tinnitus distress (I²=0), but heterogeneity was moderate for mood (I²=39%).

Overall there was a significant long-term effect of CBT compared to passive and active controls (Hedges’ g 0.60, 95% CI 0.39 to 0.80, random-effects model) but heterogeneity was high (I²=91%). Meta-regression analysis found a statistically significant negative association between effect sizes and time, which indicated that effect sizes decreased slightly over time. Subgroup analyses of the effects of methodological quality and publication bias did not significantly alter the main findings.

Authors’ conclusions
The findings suggested that CBT was an effective treatment for adults with tinnitus distress. Caution is warranted given that few large-scale well-controlled trials were identified.

CRD commentary
The review question was clear with detailed inclusion criteria. Several relevant sources were searched. Efforts were made to reduce potential for language and publication biases. Study quality was assessed but only summary scores were reported, so individual quality features could not be assessed. Appropriate methods to reduce reviewer error and bias were reported for study selection but it is unclear whether similar methods were used for the study quality assessment and data extraction.

Data were combined in a meta-analysis and potential sources of heterogeneity were explored. The authors appropriately noted that caution should be taken when interpreting the results given the poor quality of the included studies and the wide variation in terms of content of CBT and measurement of outcomes.

The authors’ cautious conclusions reflected the limitations of the evidence presented and are likely to be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that large well-controlled CBT trials of diverse samples of participants with tinnitus were required. Future studies should focus on the processes or mechanisms of effective treatment to improve treatment approaches and help determine specific and common factors in CBT for tinnitus.

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