Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: a meta-analysis
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CRD summary
This review assessed cognitive-behaviour therapy (CBT) via the internet for adults with depression and anxiety. The authors concluded that internet-based CBT is effective, especially with some support from a therapist. The findings are based on a statistical analysis of average effects on various symptoms. The conclusions need to be confirmed.

Authors' objectives
To determine the effectiveness of internet-based cognitive-behaviour therapy (CBT) for mood and anxiety disorders.

Searching
PubMed (1990 to 2006), PsycINFO (1990 to 2006) and the Social Sciences Citation Index were searched; the search terms were reported. Reference lists in retrieved papers and existing reviews were checked, and authors of the included studies were contacted for additional studies. Published and unpublished studies were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies comparing internet-based CBT programmes used for treatment or prevention with control or placebo were eligible for inclusion. The intervention was defined as standardised CBT that the user works through on the internet more or less independently. Studies with no therapist involvement and interventions with limited support, whereby a therapist only supports participants to work through the material (i.e. the traditional relationship between therapist and participants was not developed), were included. Computer-based interventions that did not involve the internet were excluded. The included studies had 4 to 10 intervention modules and most were treatment interventions. Controls included usual care, waiting-list, attention placebo, online discussion group, psychoeducation, self-monitoring and therapist-assisted CBT manual and information. Most of the included studies allowed usual care in both groups.

Participants included in the review
Studies in adults over 18 years of age with or without symptoms of depression and anxiety were eligible for inclusion. The included studies focused on either depression or anxiety disorders, including panic disorder, social phobia and post-traumatic stress disorder.

Outcomes assessed in the review
Studies that used instruments that explicitly measured depression and anxiety were eligible for inclusion. Patient self-rating scales and clinician-rated scales were included. Measures of intermediate outcomes such as cognition were excluded. The included studies used various outcome measures including scales, inventories, record forms and questionnaires (detailed in the report). Most studies used more than one outcome measure. Follow-up ranged from post-treatment to one year.

How were decisions on the relevance of primary studies made?
Two reviewers independently applied the inclusion criteria to retrieved papers and resolved any disagreements through discussion. How decisions were made on which papers to retrieve was not reported.

Assessment of study quality
Three criteria were used to assess study quality: prevention of foreknowledge of treatment assignment, blinded outcome assessment and completeness of follow-up. It was unclear how these criteria were applied or how many reviewers performed the assessment.

**Data extraction**
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. The post-test mean score and standard deviation (SD) for each outcome in the treatment and control group in each study were extracted to calculate an effect size (ES). If the mean and SD were not reported, F-value and p-value data were extracted to calculate the ES. If a study had more than one measure of ES, the mean was calculated for use in the analysis (so that each study had only one ES). It was unclear how outcome data collected in the same study at different follow-up time points were handled.

**Methods of synthesis**
How were the studies combined?
Meta-analysis was used to calculate pooled estimates of ES with 95% confidence intervals (CIs). A fixed-effect model, random-effects model and mixed-effects model were used (p<0.05 considered statistically significant). One study compared two treatment groups with the control group so, in order to avoid including the control group participants twice in the same meta-analysis, the control group was divided equally between the two treatment groups. The pooled ES were interpreted as small (0 to 0.32), moderate (0.33 to 0.55) or large (0.56 to 1.2).

How were differences between studies investigated?
A chi-squared test (Q statistic) and the I-squared statistic were used to assess heterogeneity between studies pooled in the meta-analyses. Post hoc subgroup analyses were conducted: treatment versus prevention; depression versus anxiety; support versus no support.

**Results of the review**
Twelve RCTs including 2,334 participants were included.

Study quality was reasonable to good. All prevented foreknowledge of treatment assignment. Most outcomes were self-reported. The loss to follow-up ranged from 3 to 34%.

A meta-analysis of all 12 studies showed a significant difference in ES in favour of internet-based CBT compared with control and statistically significant heterogeneity between the studies (random-effects model, ES 0.51, 95% CI: 0.28, 0.74). A pooled analysis of the 2 prevention studies (n=352) showed no significant difference between intervention and control. Heterogeneity between the 10 treatment studies was statistically significant and the ES in favour of internet-based CBT remained significant.

Further subgroup analysis of the treatment intervention studies showed a statistically significant small ES for depression (mixed-effects analysis, ES 0.32, 95% CI: 0.08, 0.57; 4 studies). Heterogeneity between the studies was still significant. The subgroup analysis of anxiety treatment showed a statistically significant large ES in favour of treatment (fixed-effect and mixed-effects analysis, ES 0.96, 95% CI: 0.69, 1.22; 6 studies) and no significant heterogeneity between the studies.

The pooled ES of treatment interventions was large in studies with therapist support (fixed-effect and mixed-effects analysis, ES 1.00, 95% CI: 0.75, 1.24; 5 studies) and small and just reached statistical significance in studies without therapist support (mixed-effects analysis, ES 0.26, 95% CI: 0.08, 0.44; 5 studies).

**Authors' conclusions**
The review indicated that internet-based CBT interventions, especially with therapist support, were effective.
CRD commentary
The review addressed a broad question which the inclusion criteria for participants and outcomes in particular reflected. The search covered three relevant databases and a few additional sources, mainly citations in other publications. The authors explained their decision to limit the search by date but did not mention whether studies in any language were eligible for inclusion. The included studies were either published or in-press. The potential for language and publication bias, which could have made studies with non significant findings less likely to be included, was not discussed. Steps were taken to minimise reviewer bias and errors in the selection of retrieved papers, although it was unclear if they were implemented when screening the search results. Study quality was assessed systematically using appropriate criteria but not reported in enough detail to allow independent judgment.

Attrition was apparently not taken into account in the interpretation of the findings. Procedures to minimise reviewer bias and errors in the data extraction were not reported. Meta-analysis was conducted using accepted methods and the iterative nature of the analysis was clear. The findings were based on a statistical analysis of average effects across various outcome measures and follow-up durations. Possible sources of statistical heterogeneity were thoroughly explored, but unexplained heterogeneity remained. The pooled estimates of ES cannot be transformed back to any of the units of outcome measurement used in the original studies. The analysis approach warrants a more cautious interpretation than was reflected in the authors' conclusion.

Implications of the review for practice and research
Practice: The authors stated that internet-based CBT, if proven to be effective, could be a very promising line of treatment and reach people who otherwise would not receive treatment.

Research: The authors stated that more research is needed to evaluate the effectiveness of internet-based CBT. In particular, the effect of adding therapist support needs further investigation.

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