The efficacy of light therapy in the treatment of mood disorders: a review and meta-analysis of the evidence

CRD summary
This review evaluated the efficacy of light therapy in adults with mood disorders. The authors concluded that bright light therapy and dawn simulation for seasonal affective disorder and bright light therapy for non-seasonal depression show evidence of efficacy. It was not possible to determine the reliability of these conclusions since the review had some substantial methodological limitations.

Authors' objectives
To evaluate the efficacy of light therapy in treating mood disorders.

Searching
PubMed (January 1975 to July 2003) represented the main source of reference to identify relevant studies for the review; the search terms were reported. The search strategy was also applied to MEDLINE and the Cochrane Library (search dates not supplied). The bibliographies of reviews and other relevant papers were also screened. Only articles reported in the English language were included.

Study selection
Study designs of evaluations included in the review
Placebo-controlled, randomised controlled trials (RCTs) were eligible for inclusion in the review.

Specific interventions included in the review
Studies that compared light therapy with a credible control were eligible for inclusion. Given the absence of standard definitions in the literature, the following inclusion criteria on dosing were applied:
in studies of bright light treatment for seasonal affective disorder (SAD), there had to be a minimum of 4 days of at least 3,000 lux-hours, with comparison groups receiving a maximum of 300 lux;
in studies of dawn simulation treatment, the intervention group needed to receive increasing light exposure from 0 to 200-300 lux over 1 to 2.5 hours, with comparison groups receiving an increase of less than 5 lux and/or less than 15 minutes in duration;
studies of bright light used as adjunctive treatment had to meet the same criteria as that for bright light treatment of SAD.
A variety of treatment doses was found amongst the included studies and their duration ranged from 6 to 42 days.

Participants included in the review
Studies of adults aged between 18 and 65 years in the acute phase of treatment for mood disorders (diagnosed using the American Psychiatric Association's DSM-III, DSM-III-R or DSM-IV criteria, the Research Diagnostic Criteria or the Rosenthal criteria) were eligible for inclusion. Subsyndromal diagnoses were excluded. The primary studies included patients with SAD and non-seasonal depression.

Outcomes assessed in the review
The primary outcomes of interest were psychiatric symptom measures such as the Hamilton Depression Rating and Seasonal Affective Disorders Version scores.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed the eligibility of studies for inclusion in the review. Eligible studies were then data extracted in detail prior to a final decision by the two reviewers on whether to include them. Any disagreements were resolved by consensus.

**Assessment of study quality**
The authors did not state that they assessed validity.

**Data extraction**
The authors did not state how many reviewers performed the data extraction.

For each eligible study (where possible), the number of patients, along with a mean score and standard deviation on the psychiatric outcome measures, were extracted or calculated. These were then used to derive the standardised mean difference effect size (ES), along with 95% confidence interval (CI), and then adjusted for small sample size for each study. Authors were contacted, where necessary, for further data required for subsequent meta-analysis.

**Methods of synthesis**

How were the studies combined?
The data were grouped into four categories according to disorder and treatment type: bright light for SAD; bright light for non-seasonal depression; dawn simulation for SAD; and, bright light as adjunctive treatment to antidepressant pharmacotherapy for non-seasonal depression. Pooled weighted ESs were calculated with 95% CI for each group, weighted using the inverse of variance method (a specific model was not mentioned). The pooled odds ratio (OR) and 95% CI were calculated to assess the effects on remission (defined as final Hamilton Depression Rating Scale score of 8 or less) from available data relating to bright light treatment of SAD. The method of pooling was not reported.

How were differences between studies investigated?
Where there were sufficient studies (the minimum number required was not reported), the Q test was used to assess the homogeneity of ESs across the studies. Results for the assessment of statistical heterogeneity were only reported for one of the four meta-analyses, although differences between the effects of treatment for other meta-analyses could be assessed by inspecting the forest plot. Where sufficient data were available, the Q test was also used to test the homogeneity of the ORs for the likelihood of remission.

**Results of the review**

Twenty-three RCTs were included in the review. Twenty studies (n=408) were included in the meta-analysis. One study was entered into the analysis twice under separate intervention categories.

**SAD.**

Bright light therapy significantly improved depression compared with control; the pooled ES (8 studies) was 0.84 (95% CI: 0.60, 1.08, P<0.0001). Significant statistical heterogeneity was found (P<0.0001). All studies showed a similar direction of treatment effect.

Dawn simulation significantly improved depression compared with control; the ES (5 studies) was 0.73 (95% CI: 0.37, 1.08, P<0.0001). Studies were consistently positive.

**Non-seasonal depression.**

Bright light therapy significantly improved depression compared with control; the pooled ES (3 studies) was 0.53 (95% CI: 0.18, 0.89, P<0.003). There was no significant difference between adjunctive bright light therapy and control; the pooled ES (5 studies) was -0.01 (95% CI: -0.36, 0.34, P>0.95).

Bright light treatment of SAD significantly improved the likelihood of remission; the pooled OR (4 studies) was 2.9 (95% CI: 1.6, 5.4). Significant heterogeneity was found (P<0.04) but all studies showed consistently positive results.
Authors' conclusions
Bright light therapy and dawn simulation for SAD and bright light therapy for non-seasonal depression show evidence of efficacy. These findings are comparable to those from pharmacotherapy trials.

CRD commentary
The review question was clear and the inclusion criteria were explicit. The search strategy appeared to be restricted to one database as the main source of reference; the comprehensiveness of supplementary database searches was not clear. The restriction to English language papers means that language bias is a potential threat, while the lack of searches for unpublished material means that relevant studies might have been missed. Publication bias was not assessed. The lack of a validity assessment meant that it was not possible to determine the quality of the included studies. Methods were used to minimise bias in the study selection process, but methods used to extract the data were not described in full.

Adequate detail on the primary studies was supplied. The method of synthesis appeared appropriate, although it was not entirely clear what method of meta-analysis had been used. The results for the assessment of statistical heterogeneity were only reported for one of the four meta-analyses; differences between treatment effects of individual studies for other meta-analyses could be assessed by inspecting the forest plots. One of the forest plots (bright light as adjunctive treatment for non-seasonal depression) showed studies with different directions of treatment effects, but the implications of this were not discussed in the review. The authors' conclusions are an accurate reflection of the evidence presented, and are relevant to a clearly defined population. However, owing to the methodological limitations, it is not possible to determine the reliability of the conclusions.

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

Research: The authors stated that more rigorous research is required to evaluate light therapy for mood disorders. The definition of parameters for active and placebo conditions, along with the use of adequate sample sizes with different population subgroups, and the exploration of optimum doses and safety issues, all merit special consideration.

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**Record Status**
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