Review: greater intensity of light leads to a greater reduction in typical (but not atypical) depressive symptoms in seasonal affective disorder


Question
In people with seasonal affective disorder (SAD), do higher intensities of light lead to greater antidepressive effects?

Data sources
Studies were identified by searching Medline, PsycLIT, the bibliography of the Society for Light Treatment and Biological Rhythm, and bibliographies of relevant books and journal articles. Researchers and colleagues in the field were contacted to locate published and unpublished studies.

Study selection
Published and unpublished studies were selected if they involved experimental manipulation of light therapy and if depressive symptoms were measured using the Hamilton Depression Rating Scale (HDRS) or scales that measured atypical symptoms.

Data extraction
Data were extracted on research design, sampling, patient characteristics, treatment characteristics, outcome measures, and statistical data for calculating effect sizes.

Main results
39 studies met the selection criteria. Studies were grouped according to timing of treatment and the intensity of light used: strong light (≥6000 lux), medium light (1700–3500 lux), and dim light (≤600 lux). The fixed effects model was used to combine the results in meta-analysis. In the morning, strong light was more effective than medium or dim light (p < 0.05) and medium light was more effective than dim light (p < 0.05) for reducing depressive symptoms measured with the HDRS; no dose response effect on depressive symptoms was seen when atypical symptoms were measured (table). In studies that used phototherapy in the morning and evening, medium light was more effective than dim light for reducing depressive symptoms (p < 0.05) (table).

Conclusions
In people with seasonal affective disorder, a dose response relation exists between the intensity of light and reduction in typical depressive symptoms. No dose response relation exists for atypical symptoms.

Phototherapy vs no phototherapy for reducing depressive symptoms (follow up not reported)*

<table>
<thead>
<tr>
<th>Depression scale</th>
<th>Light intensity</th>
<th>Timing</th>
<th>Effect size (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDRS Dim AM</td>
<td>1.1 (0.8 to 1.5)</td>
<td></td>
<td></td>
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<tr>
<td>HDRS Dim PM</td>
<td>1.1 (0.8 to 1.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDRS Strong AM</td>
<td>2.9 (2.3 to 3.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDRS Strong PM</td>
<td>2.9 (2.3 to 3.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atypical symptoms Dim AM</td>
<td>1.3 (1.0 to 1.6)</td>
<td></td>
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<tr>
<td>Atypical symptoms Medium AM</td>
<td>1.4 (1.2 to 1.7)</td>
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<td>Atypical symptoms Medium AM</td>
<td>1.4 (1.2 to 1.7)</td>
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</tr>
<tr>
<td>HDRS Dim AM and PM</td>
<td>0.6 (0.2 to 1.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDRS Medium AM and PM</td>
<td>2.1 (1.8 to 2.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*HDRS = Hamilton Depression Rating Scale.

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Commentary

Many studies have shown that treatment with bright white light results in therapeutic response rates that range from 50–80% in SAD. Nevertheless, several major issues remain unresolved about clinical efficacy of light treatment and its mechanism of action. In the meta-analysis by Lee and Chan, stronger light was found to be more effective than weaker light in controlling for the typical symptoms of depression but not for the atypical symptoms that characterise SAD. The authors were, however, not able to control for known factors which, in combination with light intensity, influence the outcome of the treatment. The practical consequences of their findings for clinicians (ie, higher light intensity is better) are therefore ambiguous. At least 9 factors could also influence the therapeutic outcome: (1) the lighting device, (2) the spectrum of light, (3) the distance between patient and device, (4) the circadian timing of light exposure, (5) the duration of exposure to light, (6) the duration of treatment, (7) the relative contribution of a placebo response, (8) the duration and severity of symptoms of SAD before treatment, and (9) the presence of atypical symptoms. To date, little is known about the relative contribution of these factors for daily clinical practice. Nevertheless, it has been widely accepted that exposure to bright white light with high intensity, usually 10 000 lux for 30 minutes each morning for ≥5 days, is the treatment of choice for SAD.

According to Wirz-Justice we need to separate 2 issues in the scientific literature: clinical efficacy of light and mechanisms of action. Clinical studies clearly support the claim that bright white light is an antidepressant but do not elucidate how it works. Further fundamental research is needed to tease out the mechanisms.

Alex L Van Bemmel, MD, PhD
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