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A behavioral intervention for insomnia improves blood pressure

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Insomnia is associated with sympathetic nervous system (SNS) arousal ¹ and hypertension ². We tested whether improving sleep in individuals with insomnia affects blood pressure (BP).

Fourteen adults with chronic insomnia ³ completed the study (n=8 females; age: 46.6 ± 11.5 y; BMI: 26.8 ± 4.2 kg/m²). Exclusion criteria included sleep apnea, periodic limb movement disorder (PLMD), restless legs syndrome (RLS), narcolepsy, psychiatric/neurologic disorders, shift work, recent trans-meridian travel, a child at home who is younger than 1-year-old, and current pregnancy.

Participants wore amber or clear lenses for two hours preceding bedtime (and during any nocturnal awakenings, e.g., prolonged nocturnal awakenings, or briefer awakenings for going to the bathroom, etc.) for seven consecutive nights in a randomized crossover trial (four-week washout). Amber lenses had 65% blue-light absorption and 90% visible light transmission (VLT). Clear lenses had 92% VLT and negligible blue-light absorption (Specifications provided by manufacturer: Uvex, Honeywell Safety). Lenses were in Uvex Bandit wraparound frames. The IRB of Columbia University Medical Center approved procedures and participants provided written informed consent.

Sleep was evaluated on a 7-point scale for quality (1: extremely bad, 7: extremely good) and soundness (1: extremely light, 7: extremely sound). Sleep on the final night of the intervention was rated as significantly more sound ($p=0.02$, paired t-test), and showed a non-significant trend for higher quality rating ($p=0.07$), in amber vs. clear. Based on univariate ANCOVA with condition (fixed factor), condition-at-first-visit (covariate), and treatment x order interaction, there were no main effects of order (p -values > 0.13) and no significant treatment x order interactions (p -values > 0.13) on BP outcomes. Reductions in mean arterial pressure (mean $\pm$ SEM: 92.91 ± 3.11 vs. 99.13 ± 4.02 mm Hg; $p=0.05$; $d=0.58$), systolic BP (122.43 ± 4.30 vs. 129.29 ± 5.57 mm Hg; $p=0.11$; $d=0.47$) and diastolic BP (78.79 ± 2.55 vs. 84.00 ± 3.59 mm Hg; $p=0.06$; $d=0.57$) were seen in amber vs. clear conditions.

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Wearing amber-tinted lenses as a behavioral intervention aimed at reducing exposure to pre-bedtime blue-wavelength light was found to reduce BP. This BP-lowering effect may have been caused by an improvement in sleep⁴ or by reducing stress/anxiety and SNS arousal⁵. This approach should be tested in individuals with comorbid hypertension and insomnia.

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