

INVESTIGACIÓN - MEDICINA

CAN VASCULAR PHOTOBIMODULATION BE A NON-INVASIVE PATHWAY TO IMPROVE SLEEP QUALITY? A RANDOMIZED PLACEBO-CONTROLLED CLINICAL TRIAL

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Background: Sleep quality is a fundamental determinant of human health and well-being. Vascular Photobiomodulation (VPBM), a non-invasive therapeutic modality, has emerged as a potential intervention for sleep-related disturbances. Its proposed mechanisms include the reduction of blood viscosity and platelet aggregation, activation of superoxide dismutase, increased oxygen bioavailability, enhanced microcirculation, elevated serotonin levels, and decreased cortisol concentrations—physiological processes intricately linked to

sleep regulation, mood modulation, and stress response. Objective: To assess the effects of Vascular Photobiomodulation (VPBM) on sleep quality in individuals with self-reported sleep disturbances. Methods: A randomized, placebo-controlled clinical trial was conducted involving participants who reported poor sleep quality. Subjects were allocated into two groups: one received VPBM using a 660 nm red laser, while the control group received a placebo intervention (light emission with sub-therapeutic power, <1 mW). Both groups underwent identical treatment schedules. Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS) at baseline and after six treatment sessions. Results: Participants in the VPBM group demonstrated statistically significant improvements in sleep parameters. PSQI scores decreased from 10.24 at baseline to 6.47 post-treatment, and ESS scores improved from 10.44 to 10.12. These findings indicate enhanced overall sleep quality, reduced sleep latency, and diminished daytime sleepiness, with the most pronounced effects observed in PSQI score reductions. Conclusion: Vascular Photobiomodulation appears to be a promising non-invasive strategy to enhance sleep quality. The observed clinical outcomes are comparable to those reported in both pharmacological and behavioral sleep interventions, particularly with regard to improvements in PSQI scores. These preliminary findings demonstrate the safety and efficiency of the application and justify further investigations to elucidate the underlying mechanisms, optimize treatment parameters (e.g., dosimetry and duration), and expand evaluation protocols to include biomarkers and polysomnographic analysis.

Palavras-chave: photobiomodulation; vascular photobiomodulation; sleep quality.