Transcranial Photobiomodulation and Firefighter Health and Wellness: A Single-Arm, Open-Label Pilot Study

Background: First responders are often exposed to many physically and mentally stressful events throughout their careers, and common complaints include poor sleep quality, chronic pain, post-traumatic stress symptoms, mood dysregulation, and cognitive impairments. ***Objective:*** We performed an open protocol, active treatment-only study with a small sample of male firefighters (n = 16) to examine the effects of transcranial photobiomodulation (PBM) on self-reported symptom measures and objective measures of cognitive function. ***Methods/Materials and Methods:*** The treatment consisted of 810 nm near-infrared light to the head using four transcranial LEDs and one intranasal LED. Treatment duration was 20 min per session, 3-4 sessions per week for 8 weeks. ***Results:*** We found significant pre-/post-treatment improvements with moderate-to-large effect sizes in mood and post-traumatic stress symptoms, pain interference, and readiness for social reintegration, and across all measures of fluid cognition. ***Conclusions:*** This proof-of-concept study also demonstrated no significant side effects, good compliance, and feasibility of use in a first responder population. Though additional research is required, PBM may present a relatively cost-effective, well-tolerated, low-risk, and easy-to-use treatment to enhance both specific symptoms and general wellness.

Keywords: PTSD; cognition; firefighters; first responders; mood; photobiomodulation.