

Blue blocker glasses as a countermeasure for alerting effects of evening light-emitting diode screen exposure in male teenagers.

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Abstract

PURPOSE: Adolescents prefer sleep and wake times that are considerably delayed compared with younger children or adults. Concomitantly, multimedia use in the evening is prevalent among teenagers and involves light exposure, particularly in the blue-wavelength range to which the biological clock and its associated arousal promotion system is the most sensitive. We investigated whether the use of blue light-blocking glasses (BB) during the evening, while sitting in front of a light-emitting diode (LED) computer screen, favors sleep initiating mechanisms at the subjective, cognitive, and physiological level.

METHODS: The ambulatory part of the study comprised 2 weeks during which the sleep-wake cycle, evening light exposure, and multimedia screen use were monitored in thirteen 15- to 17-year-old healthy male volunteers. BB or clear lenses as control glasses were worn in a counterbalanced crossover design for 1 week each, during the evening hours while using LED screens. Afterward, participants entered the laboratory and underwent an evening blue light-enriched LED screen exposure during which they wore the same glasses as during the preceding week. Salivary melatonin, subjective sleepiness, and vigilant attention were regularly assayed, and subsequent sleep was recorded by polysomnography.

RESULTS: Compared with clear lenses, BB significantly attenuated LED-induced melatonin suppression in the evening and decreased vigilant attention and subjective alertness before bedtime. Visually scored sleep stages and behavioral measures collected the morning after were not modified.

CONCLUSIONS: BB glasses may be useful in adolescents as a countermeasure for alerting effects induced by light exposure through LED screens and therefore potentially impede the negative effects modern lighting imposes on circadian physiology in the evening.

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KEYWORDS: Alerting effects of light; Attention; LED screen use; Melatonin; Sleepiness; Sleep-wake cycle

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