

Blue blocker glasses as a countermeasure for alerting effects of evening LED-screen exposure in teenagers

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Objectives: Adolescent's sleep and wake time preferences delay considerably compared to children or adults. Concomitantly, multimedia use in the evening is prevalent among teenagers involving light exposure, particularly in the blue-wavelength range to which the biological clock and its associated arousal promotion has its greatest sensitivity. We investigated whether the use of blue-light-blocking glasses (BB) during the evening, while sitting in front of a light emitting diodes (LED) computer screen, favours sleep initiating mechanisms at the physiological, subjective, and cognitive level. **Methods:** Thirteen 15–17 years old healthy male volunteers were included. The ambulatory study part comprised 2 weeks, during which their sleep-wake cycle, evening light exposure and screen use were monitored. BB or clear lenses (CL) as control glasses were worn in a counterbalanced cross over design for 1 week each, during the evening hours while using LED screens. Afterwards, participants entered the laboratory and underwent a blue-enriched-LED-screenlight exposure for 3 h prior to habitual sleep time while wearing the same glasses than during the preceding week. Salivary melatonin, subjective sleepiness and vigilant attention data were regularly collected and subsequent sleep was recorded by polysomnography. **Results:** Compared to CL, BB significantly attenuated LED-induced melatonin suppression in the evening ($P = 0.006$), decreased vigilant attention ($P = 0.008$) and increased subjective sleepiness ($P = 0.027$) prior bedtime. Visually scored sleep stages and behavioural measures collected in the morning after were not significantly affected. **Conclusion:** BB glasses can be used as a countermeasure for alerting effects in the evening in adolescents using multimedia technologies with LED screens.