CPH News and Views

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CPH-NEW
Center for the Promotion of Health in the New England Workplace

Issue #72: Shut Off the Lights? The Duality of Blue Light Exposure

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Humans have always naturally adapted to their environments and leveraged the natural phenomenon around them for survival. One instance of this is the human evolution reaction to blue light. Blue Light is a section of the visible light spectrum between 380 and 500 nm that has unique impacts on human physiology. Some believe humanity has evolved to react to blue skies, to make us naturally more active during the daytime.

It is now suspected that blue light causes a physiological reaction that suppressed our production of melatonin which influences our circadian rhythms and induces cognitive alertness. This means that in natural settings, exposure to blue light is fine – in fact, it helps regulate our bodies to match the natural day-night cycle.

However, the rise of artificial light sources has created an overabundance of unnatural blue light exposure. The most prominent of these is the usage of electrical devices, such as televisions, cell phones, and laptops, as well as exposure from artificial lights such as office lights, street lamps, and reading lights all of which emit significant amounts of blue light.

The dangers of blue light exposure are mostly in the disruption of our natural circadian rhythms. Disrupting circadian rhythms can cause the upending of sleep cycles which can then cause second order effects, such as disrupting mental health, the endocrine system, and causing weight gain (Cheung et al., 2016; Newsom, 2021; Touitou & Point, 2020). Beyond sleep issues, consistent exposure to blue light is thought to cause a myriad of eye problems, including eye strain, dry eyes, and headaches. Perhaps our grandmothers were right – sitting too close to the TV may melt our eyes! Or at least give us eye strain.

While the potential consequences of prolonged blue light exposures are concerning, there are instances in which blue light exposure can be highly beneficial (Gotter, 2017). One of the most prominent examples is for the treatment of Seasonal Affective Disorder (SAD). SAD is thought to be caused by long nights and prolonged darkness in the northern fall and winter months, where people are not getting sufficient blue light exposure. This has led to the development of light therapy lamps, which allow people to help manually regulate their circadian rhythms by regulating blue light exposure (Gotter, 2017). For countless individuals living in areas prone to SAD, blue light therapy may represent a lower cost, easily implemented intervention.

Additionally, blue light can be used in some occupational settings to improve safety and productivity (Chellappa et al., 2011). For example, many long-haul truckers need to drive large vehicles during nighttime hours, where drowsiness can be a significant safety concern. The strategic use of small blue LED lights attached to the dashboard in trucks can be used to help elevate alertness during nighttime hours, increase cognitive functioning and improve safety outcomes (Taillard et al., 2012). Furthermore, for some shift workers who frequently work nights, the usage of blue light lamps at work and blackout curtains in the day when they sleep, can help create an artificially alter circadian cycle to protect them from harmful circadian rhythm disruption in their work/sleep environments.

With all of this in mind, what can we do to regulate our blue light exposure? There are several practical recommendations for managing everyday exposure. Many electronics are

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beginning to introduce a “night light” feature. This feature changes display settings to automatically filter out blue lights and introduce warmer colors. Similarly, some companies are offering “blue light glasses”, which allow the wearer to filter out blue light and minimize exposure. If these are unavailable or unaffordable, there is an alternative known as the 20/20/20 method. This method recommends that when using screens for prolonged periods of time, that every 20 minutes, a person should look 20 feet away for 20 seconds. While this method does not help directly with blue light exposure, it can help relieve some of the eye strain associated with its exposure.

Another method to help is to use alternate light bulbs. For example, those who use reading lamps before bed, should consider switching from white bulbs to amber or red bulbs. These bulbs allow for the same functionality (you can see!) but contain dramatically reduced artificial blue light. This change would allow for those nighttime readers to still get a few chapters in without disrupting their sleep cycle.

Ultimately, this will continue to be a societal challenge. Ideally, the responsibility is on the designer of electronics and artificial lights to be aware of the consequences of their products and to make changes accordingly. As more customers learn about the effects of blue lights, their purchasing of these products increases, as does the demand for these products. Companies adapt accordingly, to expand their product lines and availability of these products. We already see an uptick in this trend, and future designs of artificial lighting may lead to an expansion of solutions that minimizes health risks while maximizing benefits.

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