CASE REPORTS

Managing Photophobia with the Utilisation of Smart Light Bulbs

Yujia Zhou, Sushant Wagley, Collin M. McClelland, and Michael S. Lee

Department of Ophthalmology and Visual Neurosciences, University of Minnesota, Minneapolis, Minnesota, USA

ABSTRACT

Photophobia can affect a person's quality of life. We present a case of idiopathic photophobia that was successfully managed with smart light bulbs that allowed the patient to participate in daily activities. Smart light can complement other treatment options including tinted lenses. In conclusion, smart light is a novel way of treating photophobia and should be considered by clinicians.

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Photophobia; smart light; personalisation

Introduction

Photophobia represents the behaviour of avoiding light due to discomfort of the eyes or headache.¹ Photophobia can result in minor to significant disability, and it may have an underlying ophthalmological, neurological, psychiatric or medication-induced aetiology¹; or it may be idiopathic. In addition to treating any identifiable, predisposing condition, tinted lenses remain the mainstay of current treatment. We report the novel use of smart light bulbs for the management of idiopathic photophobia.

Case report

An 18-year-old woman presented with extreme photophobia for several years. Examination showed no evidence of ocular disease and brain magnetic resonance imaging was normal. She denied a history of headaches or head trauma. Sunglasses, FL-41 tinted lenses, and tinted contact lenses provided minimal benefit. Her mental health deteriorated such that she spent the majority of the day in a dark bedroom. We recommended smart light bulbs to identify a specific hue that she could tolerate and to gradually increase the intensity. She used the Philips Hue White and Colour Ambiance bulb (Phillips, Amsterdam, Netherlands). She reported significant improvement in symptoms with red and green lighting and tolerated 100% intensity. Her mother reported that they could

have the lights on at the dinner table, whereas previously they ate in the dark. This resulted in substantial benefit to her emotional well-being and allowed her to participate in her life more actively. However, she continued to struggle with photophobia outside the home.

Discussion

Tinted lenses and sunglasses are frequently used to treat photophobia.² Sunglasses obstruct all frequencies of light, which makes it difficult for patients to see visual details, especially in a dim environment. Tinted lenses, such as FL-41, have specific transmission properties that block certain wavelengths (around 480 nm) of light that contribute to photophobia.³ In a study of post-concussion patients, blue-coloured lenses were the most common colour that produced relief, followed by green, red, and purple; and most of the patients had symptomatic improvement with multiple colours.² However, the colour of the tinted lenses is fixed and it may not cater to the patients' personal needs. In addition, photophobic patients should not wear darkly-tinted lenses indoors, because they may become even more sensitive to light as their eyes become increasingly dark-adapted.^{2,3}

To our knowledge, smart light bulb use for the treatment of photophobia has not been reported. Smart light bulbs allow one to personalise lighting conditions and may represent an effective

treatment modality for photophobia. Each photophobic patient may be sensitive to a specific individualised intensity or frequency of light. For example, most migraine patients may be uncomfortable with red and blue lights, but this is not universal.⁴ Patients can change the intensity and colour of the smart light bulbs based on individual comfort level to provide symptomatic relief and maximise their function in daily activities. Smart light bulbs and tinted lenses can complement each other and be mutually beneficial to the photophobic patient. The portability of tinted lens utilisation in all environments including outside are helpful while the ease with which light intensity and wave length emissions can be personalised with smart light bulbs renders additional benefits particularly inside.

In the future, investigators could design a randomised controlled trial comparing smart light bulbs with standard placebo incandescent light bulbs. The participants in each group may be required to use the light bulbs for a certain number of hours a day. A standardised questionnaire such as the Utah Photophobia Symptom Impact Scale (UPSIS-17) could be used to assess patient-reported outcomes. The participants assigned with the smart light bulbs would record the wavelengths and intensity of light that they prefer in relation to their symptom severity from day to day. A study such as this could take place in a controlled location with standardised lighting but would be limited to a short duration of time. If the study takes place in the participants' own homes, there would be interference from other light sources in a normal living

environment and it would be difficult to monitor the compliance.

Conclusions

In conclusion, we present a patient with severe idiopathic photophobia who benefited greatly from smart light bulbs, and these light bulbs deserve consideration in the management of photophobia. Patients' perceived improvement of symptoms is important in choosing an effective treatment modality. Further study is warranted to determine what percentage of patients value smart light bulbs and the effect on the quality of life.

Declaration of interest statement

The authors declare no conflict of interest.

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