Singh Sumeer (Orcid ID: 0000-0003-3519-7037)
Downie Laura (Orcid ID: 0000-0002-1596-2259)

Letter to the Editor

Are current ophthalmology clinical practices relating to blue light-filtering intraocular lenses evidence-based?

Sumeer Singh MPhil,[1] Andrew J Anderson PhD,[1] Stephanie L Watson FRANZCO PhD[2] and Laura E Downie PhD[1]

[1]Department of Optometry and Vision Sciences, The University of Melbourne, Victoria, Australia; [2]The University of Sydney, Save Sight Institute, Discipline of Ophthalmology, Sydney Medical School, Sydney, New South Wales, Australia.

Correspondence: Dr Laura E Downie, Senior Lecturer, Department of Optometry and Vision Sciences, The University of Melbourne, Parkville VIC Australia 3010
Email: ldownie@unimelb.edu.au

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Cataract surgery, with intraocular lens (IOL) implantation, is a common surgical procedure. Current types of IOLs include those that filter ultraviolet (UV) only, or UV and blue light. Although protracted exposure to high-intensity blue light leads to retinal damage under experimental conditions,[1,2] a recent systematic review found a lack of clinical evidence to support using blue light-filtering IOLs for preserving macular health or altering the long-term risks of age-related macular degeneration (AMD).[3] Furthermore, clinicians have been urged to be mindful of this lack of evidence when considering implantation of blue light-filtering IOLs.[4] However, to date, no research has investigated ophthalmologists' knowledge, attitudes or clinical practice patterns in relation to these devices; we sought to examine these factors.

This study, undertaken between May 2018 and February 2019, involved Australian ophthalmologists completing an anonymous, online questionnaire, adapted from a previous study[5] to approximately align with the current study population. The questionnaire consisted of the following sections: (i) Practitioner demographics and practice modality; (ii) Knowledge of blue light and its potential ocular effects; (iii) Frequency and prescribing of blue light-filtering IOLs; and (iv) Perceptions of the evidence for blue light-blocking IOLs. Approval was granted by the University of Melbourne Human Research Ethics Committee (#1851566).

Completed responses were received from 72 ophthalmologists, hereafter referred to as the respondents, representing ~9% of all Australian ophthalmologists. Table 1 summarises the respondent demographics. Four in five respondents correctly identified the wavelength range of blue light (400–500nm). A similar proportion did not consider blue light to cause retinal damage. In terms of sources considered to emit clinically important levels of blue light, most (80%) respondents nominated the sun, and almost half selected mobile phones (Figure 1a).

The majority (88%) of practitioners performed cataract surgery, hereafter referred to as cataract surgeons. Of these, approximately half reported never recommending blue light-filtering IOLs to their patients. The remaining cataract surgeons nominated

that they recommended theses lenses occasionally (16%), sometimes (5%), mostly (13%) or always (16%). Of cataract surgeons who did not recommend blue light-filtering IOLs, 53% gave the reason that these lenses were not clinically justified.

Of cataract surgeons who implanted blue light-filtering IOLs, the three most frequent reasons were to act as a general safety measure against blue light (58%), that their preferred IOL was only available with a blue light filter (45%), and/or that the patient was at risk of developing AMD (39%). The most common sources of information and/or evidence used by cataract surgeons to guide their clinical decision-making regarding blue light filtering IOLs were research papers (81%), conference presentation (58%), and recommendations from colleagues (48%) (Figure 1b).

Almost half of respondents considered advertisements for blue light-filtering products to not accurately represent the risks associated with blue light exposure (Figure 2a), and ~70% of respondents considered there to be low quality evidence supporting the benefit(s) of blue light-filtering IOLs on macular health (Figure 2b). In assessing practitioners' perceptions regarding potential adverse effects, one in three respondents considered these implants to have adverse effects on colour vision, followed by sleep quality (31%), scotopic vision (18%) and photopic vision (14%), with the remainder nominating 'none of the above' (42%).

Our results indicate that one in two Australian cataract surgery respondents recommend blue light-filtering IOLs, despite only 25% considering daily environmental light to cause retinal damage. This discrepancy may reflect, at least in part, that almost half of respondents reported their preferred IOL to only be available with a blue light filter, suggesting that recommending these devices does not necessarily relate to their blue light-filtering properties *per se*. Cognitive dissonance in clinical decision-making in this practice area was also evident. Despite ~70% of respondents considering the evidence for blue light-filtering IOLs being protective to macular health to be low, the most frequent reason for prescribing

these lenses was as a general safety measure against blue light. Together, these findings demonstrate that blue light-filtering IOLs may be commonly recommended by cataract surgeons in Australia, with respondents' knowledge and attitude towards these lenses being mostly consistent with the best-available research evidence.

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FIGURE LEGENDS

Figure 1: (a) Percentage of respondents who considered each source to emit 'clinically important' levels of blue light. LED, Light emitting diode light source; LCD, Light Crystal Display computer screen; E-reader, Electronic-reader; O-LED, Organic Light Emitting Diode light screen; CRT, Cathode Ray Tube. (b) Percentage of respondents who selected each source of information or evidence for guiding their clinical decision-making in relation to prescribing blue light-filtering IOLs.

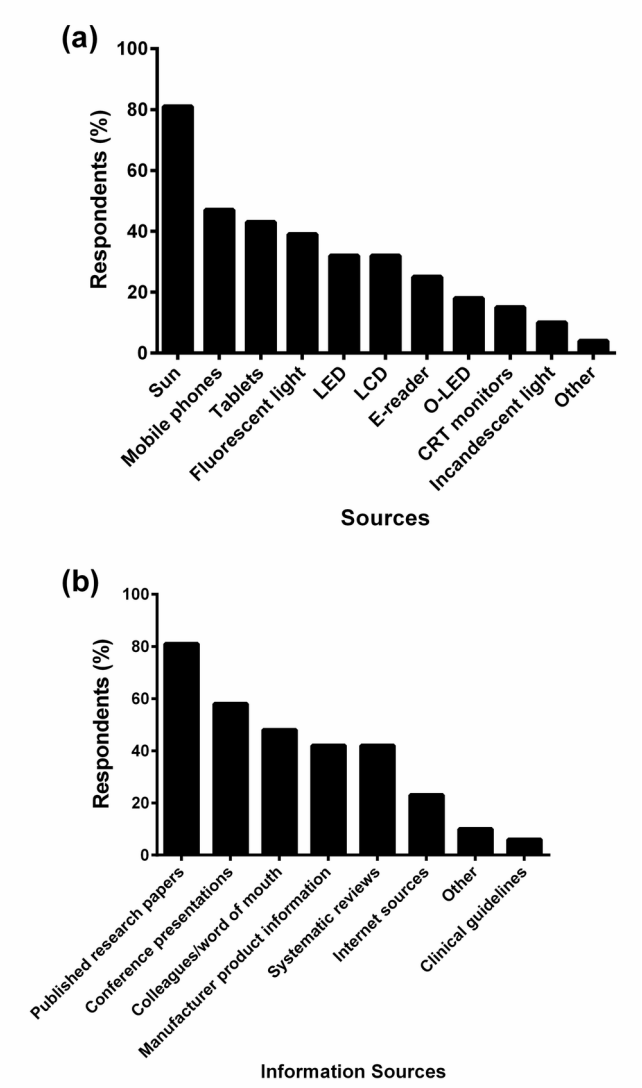
Figure 2: (a) Percentage of respondents who selected each level of agreement in relation to the statement: 'Advertisements for blue light-filtering products provide an accurate representation of the risks associated with blue light exposure.' (b) Respondents' perceived quality of the evidence relating to the potential beneficial effect of blue light-filtering IOLs on macular health, relative to UV-only filtering IOLs.

TABLE

Table 1: Participant demographic information

Characteristic	Number of responses (%)
Gender (n=72)	
Male	53 (74)
Female	19 (26)
Principal type of work (n=72)	
Academia	5 (7)
Private (Independent practice)	50 (69)
Multi-speciality hospital	3 (4)
Refractive surgery clinic	2 (3)
Public hospital	10 (14)
Other	2 (3)
Major mode of practice (n=72)	
General	17 (24)
Subspecialist	55 (76)
Sub-speciality (n=55)	
Cataract	23 (42)
Corneal and external eye disease	11 (20)
Corneal refractive surgery	9 (16)
Glaucoma	12 (22)
Medical retina	15 (27)
Neuro-ophthalmology	2 (4)
Ocular oncology	3 (6)
Oculoplastics	3 (6)
Paediatrics	4 (7)
Strabismus	2 (4)
Uveitis and inflammatory eye disease	5 (9)
Vitreo-retinal	7 (13)
Other	1 (2)
Years of ophthalmology experience (n = 72)	

0-10 years	8 (11)
11-20 years	25 (35)
21-30 years	19 (26)
>31 years	20 (28)



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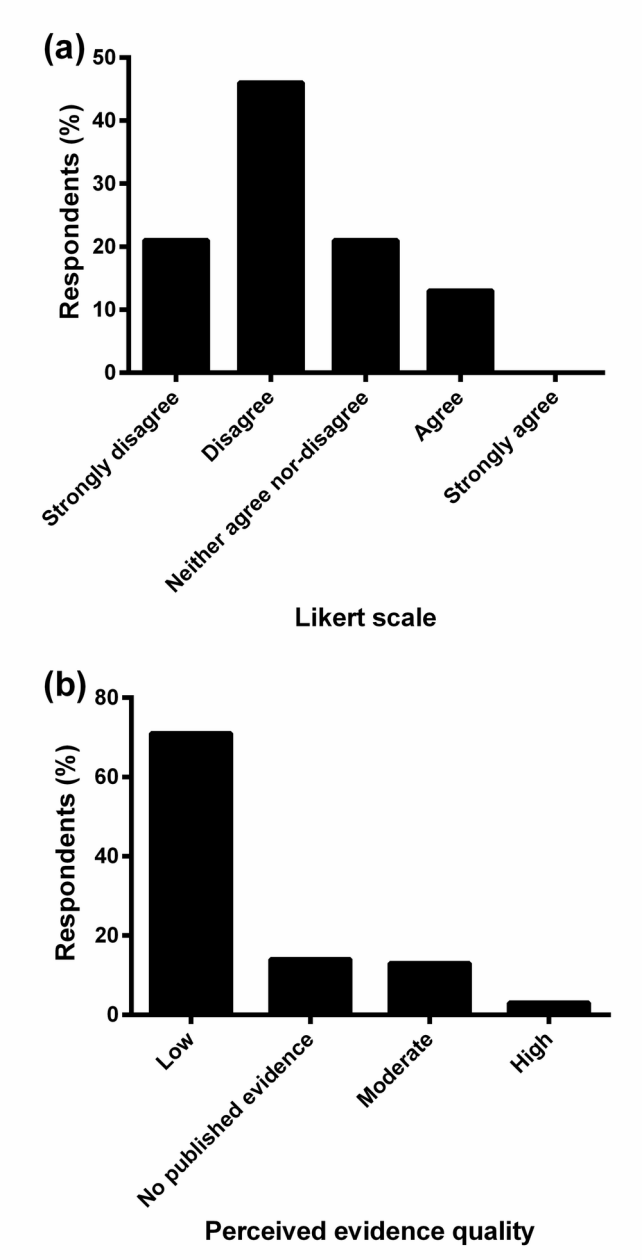

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