

# Experiences following cataract surgery – patient perspectives

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**Citation information:** Webber KJ, Fylan F, Wood JM, & Elliott DB. Experiences following cataract surgery – patient perspectives. *Ophthalmic Physiol Opt* 2020; 40: 540–548. <https://doi.org/10.1111/opo.12709>

**Keywords:** communication, health decision making, quality of life, spectacle adaptation

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Received: 6 January 2020; In Revised form: 20 April 2020; Accepted: 19 May 2020; Published online: 11 July 2020

Author contributions: Conception or design of the work – all authors. Data collection – KW and FF. Data analysis and interpretation – KW and FF. Drafting the article – KW and FF. Critical revision of the article – all authors. Final approval of the version to be published – all authors.

## Abstract

**Purpose:** Most patients report being highly satisfied with the outcome of cataract surgery but there are variable reports regarding the impact of cataract surgery on some real-world activities, such as fall rates. We hypothesised that adaptations to changed refractive correction and visual function may cause difficulties in undertaking everyday activities for some patients and used a series of focus groups to explore this issue.

**Method:** Qualitative methods were used to explore patients' experiences of their vision following cataract surgery, including adaptation to vision changes and their post-surgical spectacle prescription. Twenty-six participants took part in five focus groups (Mean age =  $68.2 \pm 11.4$  years), and the data were analysed using thematic analysis.

**Results:** We identified three themes. 'Changes to Vision' explores participants' adaptation following cataract surgery. While several had problems with tasks relying on binocular vision, few found them bothersome and they resolved following second eye surgery. Participants described a trial and error approach to solving these problems rather than applying solutions suggested by their eyecare professionals. 'Prescription Restrictions' describes the long-term vision problems that pre-surgery myopic patients experienced as a consequence of becoming emmetropic following surgery and thus needing spectacles for reading and other close work activities, which they did not need before surgery. Very few reported that they had the information or time to make a decision regarding their post-operative correction. 'Information Needs' describes participant's responses to the post-surgical information they were given, and the unmet information need regarding when they can drive following surgery.

**Conclusion:** The findings highlight the need for clinicians to provide information on adaptation effects, assist patients to select the refractive outcome that best suits their lifestyle, and provide clear advice about when patients can start driving again. Patients need to be provided with better guidance from clinicians and prescribing guidelines for clinicians would be beneficial, particularly for the period between first- and second-eye surgery.

## Introduction

Cataract surgery is the most frequently undertaken surgical procedure performed in the UK's public healthcare service (NHS), with over 400 000 surgeries performed in the UK every year.<sup>1</sup> While the benefits of cataract

surgery are well established in terms of the improvements in visual function and overall quality of life,<sup>2</sup> evidence regarding the impact of cataract surgery for some real-world activities, has been variable. For example, although studies have shown improvements in fall rates following cataract surgery,<sup>3</sup> others have failed to show

any improvement<sup>4,5</sup> and one study reported an increased risk of injurious falls.<sup>6</sup> Of relevance is the finding that changes in spectacle correction greater than 0.75D have been shown to increase fall rates,<sup>7</sup> so that when such changes occur as part of cataract surgery, they can increase the fall risk for some patients.<sup>3</sup> In addition, having to adapt to new multifocal spectacles after a period without them (such as between first- and second-eye surgeries) can also increase fall rates<sup>5</sup> and dizziness can be increased due to large changes in power or axis of astigmatic refractive correction after cataract surgery.<sup>5</sup>

In addition to the difficulties in adapting to new spectacles, there are also difficulties in adapting to the changed visual function. Cataracts often develop over many years and the eyes and brain adapt to the blurred vision, changes in colour vision and likely other aspects such as stereopsis. It can take several months for the eyes and brain to readapt following surgery.<sup>8,9</sup> In addition to the impact of cataract surgery on falls rates already discussed, studies have also reported improvements in driving (in terms of performance and crash rates) and physical activity. In some of these studies, improvements following cataract surgery have not been as positive as might be expected and require further investigation. For example, while cataract surgery has been reported to reduce motor vehicle crash rates<sup>10,11,12,13,14</sup>, the reduction in crash rates in some of the larger scale studies seems relatively low (9% reduction in serious crashes<sup>14</sup> and 13% reduction in all police-reported crashes.<sup>12</sup> Indeed, in one of these studies, some types of crashes ('head on' and 'hit pedestrian') increased after first-eye surgery which the authors argued warranted further investigation.<sup>12</sup> Similarly, in a more recent study that investigated both first- and second-eye cataract surgery, crash rates reduced after both first and second eye compared to before cataract surgery, but crash rates were higher after second-eye surgery than after first-eye surgery (though still lower than prior to surgery), which the authors suggested could be caused in part by problems adapting to new refractive corrections after second-eye surgery.<sup>13</sup> In terms of physical activity, a similar theme emerges in that cataract surgery improves moderate physical activity levels, but there were no changes in some activities, such as walking and gardening, and a trend towards decreased vigorous physical activity ( $p = 0.07$ ) after first-eye surgery, that the authors felt might have been due to the unbalanced nature of vision and refractive correction after first-eye surgery.<sup>15</sup>

Given the variable evidence in the literature regarding the impact of surgery on everyday activities, the purpose of this study was to explore individual patient experiences in adapting to their changing vision following cataract surgery. To identify any adaptation difficulties post-cataract

surgery, we organised a series of focus groups with patients who had recently had cataract surgery and discussed their experiences of adaptations to the surgery in the short and medium term, including their adaptations to any new spectacles. This is the first study of its type and provides an opportunity to gather information about patient experience on an individual level and in a richer level of detail that is typically missing from trials and cohort studies.

## Materials and methods

### Participants

Participants were 26 patients who had undergone age-related cataract surgery within the last year, recruited via a specialist recruitment agency in West Yorkshire, UK. The mean age was  $68.2 \pm 11.4$  years, range 54–91 years), 73% were female and 27% male. All patients received cataract surgery with monofocal intraocular lenses via the UK National Health Service (NHS), with seven receiving first-eye surgery and 18 receiving second-eye surgery with a mean time of 7 (range 1–12) months since their latest surgery and 14 (range 3–60) months since their first eye surgery for the 18 patients who had recently undergone second-eye surgery. Participants attended one of five focus groups; demographic details and whether they had undergone first- or second-eye surgery and the time since their last surgery are provided in *Table 1*.

### Procedure

Data collection was undertaken using focus groups, which provide an opportunity for participants to discuss their thoughts, feelings, expectations and experiences, and provide more depth of understanding than would be possible in a survey.<sup>16</sup> We held five focus groups, each with between four and six participants, to explore experiences of visual adaptation following cataract surgery. Participants who had recently had second-eye surgery were encouraged to discuss their issues post- first- and second-eye operations. Focus groups were facilitated by two researchers (KW and FF). One of the two researchers (KW) is an optometrist, who brought clinical expertise to the focus groups. She was introduced to the participants as a researcher, rather than a clinician, to avoid participants feeling obliged to speak positively about their surgery. The other researcher (FF) is a health psychologist who has extensive experience in qualitative research methods. Again, she was introduced as a researcher rather than a clinician. The participants were not known to either of the researchers.

Discussions followed a semi-structured topic guide and covered:

- The surgery itself.
- Improvement in vision following surgery.

**Table 1.** Demographic details and information regarding their cataract surgery of participants as a function of focus group participation

Focus group	Participants			
	Sex	Age	1 <sup>st</sup> /2 <sup>nd</sup> Eye	Time since surgery
1	M	70	2 <sup>nd</sup>	2/12
	F	56	2 <sup>nd</sup>	2/12
	F	69	1 <sup>st</sup>	1/12
	M	65	2 <sup>nd</sup>	4/12
	F	68	2 <sup>nd</sup>	4/12
2	F	75	2 <sup>nd</sup>	5/12
	F	70	2 <sup>nd</sup>	12/12
	F	89	1 <sup>st</sup>	10/12
	F	70	2 <sup>nd</sup>	8/12
	F	91	2 <sup>nd</sup>	12/12
3	M	54	2 <sup>nd</sup>	11/12
	F	56	2 <sup>nd</sup>	11/12
	M	88	2 <sup>nd</sup>	8/12
	M	78	1 <sup>st</sup>	6/12
	F	57	2 <sup>nd</sup>	5/12
4	F	73	2 <sup>nd</sup>	2/12
	F	69	2 <sup>nd</sup>	
	F	40	1 <sup>st</sup>	11/12
	F	74	2 <sup>nd</sup>	11/12
	F	60	1 <sup>st</sup>	12/12
5	M	67	2 <sup>nd</sup>	5/12
	M	70	1 <sup>st</sup>	9/12
	F	65	2 <sup>nd</sup>	5/12
	F	69	2 <sup>nd</sup>	1/12
	F	74	2 <sup>nd</sup>	14/12
	F	56	1 <sup>st</sup>	1/12

- Adaptation to post-surgical vision, including tasks that were affected and how bothersome any period of adaptation was.
- The type of spectacles they had worn before surgery and whether this changed post-surgery.
- Any discussions about their post-surgical spectacle prescription prior to surgery.
- The information that patients were given (both before and after surgery) and any additional information that would have been useful.

Each focus group lasted one hour and, with permission from participants, was audio recorded and transcribed verbatim. The study followed the tenets of the Declaration of Helsinki and ethical approval was granted by the University of Bradford. All participants were given a full explanation of the nature of the study, what taking part would involve, and how to withdraw from the research. Written informed consent was obtained.

#### Data analysis

Transcripts were analysed thematically using the methods of Braun and Clarke.<sup>17</sup> Transcripts were coded using the

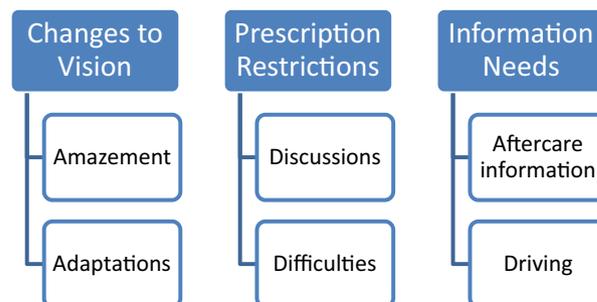
research question: what are people's experiences of visual adaptation following cataract surgery? An inductive approach was taken in which the codes arose from the data rather than by applying a pre-determined framework, which allows new and unexpected topics to be identified. Two authors independently coded the transcripts and any differences in coding were discussed and resolved. Codes were grouped together with others of similar meaning and sorted into a thematic structure that best described the data. The criteria for a theme were that it was internally homogeneous, i.e. the sub-themes it contained all shared a certain perspective, and that it was externally heterogeneous, i.e. that the themes were fundamentally different from one another. This stage was iterative, with sub-themes merging and moving between themes until a grouping was identified that provided the most parsimonious data structure while capturing the full set of codes. Quotes from the focus groups were selected on the basis that they best illustrated each sub-theme. The number of the focus group (FG1-5) is indicated in brackets after each quote, along with the gender and age of the participant. While the mean age of the different focus groups varied from 60 years (F4) to 73 years (F3), with more females than males in all groups, particularly groups 2 and 5 (83% and 80% respectively) (Table 1), there were no differences in the experiences reported following cataract surgery by participants across the five focus groups.

#### Results

We identified three themes in the data, described below and summarised in Figure 1. "Changes to Vision" was linked to our original hypothesis, but "Prescription Restrictions" and "Information Needs" were unexpected yet important issues identified by the participants.

#### Changes to vision

This theme describes how surgery transforms people's vision with an instant and striking improvement that



**Figure 1.** Thematic map showing the adaptation challenges that participants reported that they had experienced following cataract surgery.

impresses them, but that the changes do require some adaptation. There were two sub-themes. The first: 'Amazement' describes patients delight at how immediately their vision improved and how they found this instant transformation astonishing.

I even hugged the surgeon, I called him an angel; it was amazing. Female age 69, FG3

They talked about how the gradual nature of their visual change meant that they had not realised how poor their vision had become and were surprised at the extent of the change in vision due to surgery. Colours were generally described as brighter rather than being a different hue, although a few noticed colour shifts.

You get used to inferior sort of vision, don't you? Male age 65, FG1

The only downside is that I can see all the mucky marks and cobwebs and so I'm constantly going around with a cloth to wipe things, because you never noticed it before [the operation]. Female age 69, FG5

The thing I most noticed most when I'd had mine done, how everything was all different colours. You know, because everything seemed quite dim. Female age 89, FG2

I bought this coat and I thought it were black and when I'd had my eyes done I said "do you know I didn't know this coat were blue, I thought it were black." Female age 74, FG4

The second: 'Adaptations' describes the difficulties that participants experienced following their surgery, which were generally short-lived. Many talked about being very sensitive to light in the days following surgery. A common issue that was raised was that their existing spectacles were unsuitable over the period between their first and second eye surgery. Participants described various approaches to solving this problem. These included taking one of the lenses out of their existing spectacles; making a patch to cover their unoperated eye; wearing their existing spectacles throughout this period (so vision would likely be blurred in the operated eye); not wearing any spectacles at all, or making use of the vision from just their operated eye; or a combination of these strategies for different tasks. Their discussions demonstrated that they took a trial and error approach rather than applying solutions suggested by their eyecare professionals.

I just took the lens out of one of my glasses and it were fine. Male age 67, FG4

I even took the glass out of the operated eye to see if it would work and it made it even worse. I used to watch TV and cover one eye and use the one that had been operated on. I made myself a little patch myself to just cover my eye. I found it quite hard. Female age 69, FG3

After having the first one done I couldn't use my specs because obviously they were you know... I had the lens taken out of this one thinking I could get by with my lens in one and nothing in the other, it didn't work at all. I had to do with nothing at all for the period in between the two cataracts, because it was just as bad with having one lens in than it was having both lenses in. It just didn't match up. Unbalanced, that's the word. Male, age 70 FG1

A significant minority of participants experienced problems caused by their lack of post-surgical binocular vision. Some participants talked about how they had double vision for a short period of time, however the most common problem that persisted beyond the first few days post-surgery was feeling 'unbalanced'. A few also talked about how they noticed a lack of coordination with fine motor skills, for example when cooking or doing DIY ('Do It Yourself'). None of the participants experienced a fall following their surgery, although a few talked about how they had experienced difficulty with steps.

We have a set of kitchen knives with a little block that you put each knife a slot. I couldn't do that, I couldn't hit the flipping slot. Male age 70, FG1

I tend not to be able to see edges clearly though: I'm staggering about like a really old lady not seeing edges of steps and things. Female age 69, FG1

A few talked about problems with driving, including fine manoeuvring, e.g. when parking, or difficulty judging the speed of oncoming vehicles. This persisted until the surgery on their second eye.

After I had one done, I found it much more difficult to reverse into the garage. I was in danger of hitting the wall on the left-hand side. And for driving it was really hard to turn across oncoming traffic, to judge the distance and speed the car is coming towards you when you've only had one done. As soon as I had both done fine, back to normal. Male age 70, FG1

Most participants waited around four weeks after surgery on their second eye before getting new spectacles. Very few talked about visual adaptation problems with their new spectacles, although one highlighted how they had found it

difficult to negotiate steps in bifocals and one had struggled to adapt to computer lenses.

I think steps are dangerous with bifocals, because if you just look wrong, steps jump up to greet you.  
Female age 70, FG2

### Prescription restriction

This theme describes how some participants struggled with their post-surgical vision because their prescription was not optimal for their lifestyle. The first sub-theme: 'Discussions' highlights how there is a lack of communication and clarity about their final prescription following surgery and how this will impact on the type of spectacles people need to wear. While most participants were delighted with their vision and were happy that their distance vision was so good, a significant minority of participants were unhappy with their prescription following surgery because they were unable to read without their spectacles. Participants who were previously myopic found this to be a particular problem. While they recognised and appreciated that their vision had improved, they regretted that they had not had a conversation with either the Optometrist or Ophthalmologist about their final prescription prior to surgery.

You're just grateful that it's better. And then afterwards you think, oh I wish I could do this, that and the other. But if it was part of the process, to explain the options and to give options, that would be good.  
Female age 56, FG2

The majority of participants couldn't recall any conversation about their preference for a final prescription, and the few that did, felt that they did not have enough knowledge or time to be able to make an informed decision and therefore deferred to the professional. They suggested that a discussion of the implications of their final refractive correction would be useful.

I didn't really have a choice, they didn't tell me I would lose my reading ability. Female age 69, FG1

They did say to me there's different types of lenses you can have put in but I wasn't sure exactly what to go for and she [the ophthalmologist] sort of made the decision in the end. Female age 60, FG4

In addition, the explanation given didn't enable participants to appreciate the trade-off they were being asked to make between their near and distance vision with monofocal intraocular lenses as provided by the UK NHS. Some indicated to the surgeon that their reading was fine and therefore asked for their distance vision to be fixed, without

realising that targeting emmetropia post-operatively to fix their distance vision would lead to them needing reading spectacles.

Participants' discussions highlighted that they didn't understand the concept of how their prescription could be tailored so that it is best suited to their lifestyle. Many had been told that their surgeon would give them the 'best possible vision' and they did not appreciate that 'best' varies based on how they use their eyesight and would not be the same for everybody.

I would prefer to read without glasses because I've never learned to drive. Female age 73, FG3

To me, being glasses free is wonderful. I can't read without glasses but I'm not a big reader anyway.  
Female age 69, FG3

The second sub-theme 'Difficulties' describes the long-term difficulties that participants experienced due to the prescription left by the surgery. The most common problem was reading, which included reading books and papers, reading labels while shopping and reading text on their phones. Some participants described how their near vision was worse than before the surgery, and how they found this surprising and frustrating.

But my eyes, for reading, are worse, because I could see... I could actually read, before I had the operation, without my glasses. Female age 65, FG5

Although I could see distance wise, and it was great, I really missed my near vision. Just being able to look at my phone without putting my glasses on, or reading in bed without putting my glasses on, which I could do before. Female age 70, FG2

### Information needs

This theme is about the information that people receive about their surgery and post-surgical care, and about the one key area of information they reported as missing, namely advice about driving.

The first sub-theme 'Aftercare Information' describes how participants were generally happy with the information they received about their surgery and aftercare and found it informative and reassuring.

Participants varied with respect to how much detail they wanted and the extent to which they read the information provided, although everybody retained the information in case they needed to refer to it.

I read mine cover to cover, and upside down, and inside out. I did everything. Female age 69, FG5

I read it like you read an Argos instruction thing: I glanced over it. Female age 60, FG4

Participants described how the aftercare information they were given differed between their eyes depending on which consultant they saw or at which hospital they were seen. However, this did not appear to concern them, and they reported that they were content that the advice they were provided was good.

The second sub-theme: 'Driving' is about participants' unmet need for information about when they can drive after their surgery. Many participants had been motivated to have their surgery because of concerns about driving, so knowing when they would be able to drive was very important to them. Some participants did not recall receiving any information at all about when they could drive but assumed that they should wait for a few days, 'just for safety'. Those who recalled receiving advice reported very different recommendations: from a few days to several weeks before driving. Only one participant described receiving advice based on the legal driving standards. Many found themselves in a situation where they needed to drive sooner than when they had been advised but assumed that they were safe because 'you would just know' if your vision was too poor to drive.

They advised me not to drive until I was called back in a fortnight to see that everything's okay. Well, in that fortnight, we used public transport, which was a nightmare. Because I'm the only driver. . . when I got my appointment, it was an extra week, so that was making it into three weeks. So, I rang the hospital and asked. I said, look, can I drive?.... So, the ward sister came on and she says: Were you driving the day before you came in? So, I said, yes. She says, as long as you can read a number plate, nobody's interested.... So, with that, I got in the car and I was off. Female age 69, FG5

They told me, just don't drive home. Male, age 70, FG5

It's a needs must, and to be honest, it's common sense: if you can't see [you don't drive]. Female age 70, FG2

And they did say don't drive, did they say five days? But you just think, well, you know. It's not so bad if you've had one done, because you've still got one good eye, haven't you? But you just. . .

You'd maybe know, if you weren't fit to drive, you'd know.

Yes. I knew I were perfectly fine.

Yes, I did as well. Conversation between participants in FG4

## Discussion

A qualitative approach was used to explore patients' experiences of visual adaptation following cataract surgery. The immediate and striking improvement in vision led to participants being overwhelmingly pleased with the outcome; even those who had experienced complications or who were frustrated with their post-surgical prescription. However, the amazement and gratitude that people initially experienced potentially masks subsequent difficulties with their vision following surgery, that tend not to be included in studies documenting the impact of cataract surgery on activities of daily living such as walking, mobility and driving.

As expected, we found that a significant minority of our participants encountered adaptation problems between first- and second-eye surgeries due to post-surgical changes in binocular vision status, however these seemed to be generally short-lived and self-limiting. There may be a greater issue when waits between first- and second-eye surgeries are longer. These changes can potentially be problematic when they affect patients' driving ability and patients should be warned about potential problems arising from a lack of depth perception, and that they may not be able to wear their current spectacles. Only one of our participants experienced marked difficulties when driving, and as they had not been involved in a crash, their difficulties would be missed by studies that use crash risk as an outcome measure for driving. Indeed, some studies use police-reported crashes when modelling crash risk,<sup>10</sup> and while this has many advantages, it will not include minor scrapes and bumps, which could arise from a lack of binocular vision and are unlikely to be reported to the police.

Consistent with the findings of Delahunt *et al.*,<sup>8</sup> our participants noticed an immediate change in colour perception but did not find this troublesome. Although initial adaptation to these changes seems subjectively to be very quick, within minutes in the case of colour vision and days for binocular vision, evidence from Delahunt *et al.*<sup>8</sup> suggests that full adaptation can take many months for changes in colour perception and may be even longer for binocular vision. Importantly these longer term changes in adaptation were not noticed by participants. We also did not find any evidence in our discussions with participants regarding difficulties from changes in image focus as suggested by Parcosadze *et al.*<sup>9</sup>

Participants were surprised by the issues they experienced following cataract surgery, which suggests a lack of information about what to expect and advice about potential strategies to cope with these adaptation challenges. Some participants managed by relying on their operated eye, while others found their own solutions by either taking one lens out of their spectacles or making a patch to wear; particularly patients whose waiting time between first- and second-eye surgeries was similar to the current guidelines of 4–6 weeks. If the wait between surgeries was longer, some patients ordered new spectacles. This suggests that further research is needed to determine the best strategy for this interim period in regard to spectacle wear, in order to allow prescribing guidelines to be developed so that clinicians can appropriately advise their patients. In addition, because patients typically wait 4–6 weeks before obtaining new spectacles patients adapt to their interim solution and subsequently have difficulties re-adapting to new spectacles.<sup>5</sup> If spectacles could be obtained after 1–2 weeks,<sup>18,19</sup> this would provide easier re-adaptation to spectacles. The ability to provide clear distance vision for myopes after 1–2 weeks rather than the currently recommended 4–6 weeks, also makes targeting myopia post-operatively a more viable option. Longer term, bilateral surgery completed on the same day would negate many of the adaptation challenges and also provide substantial savings in health care and non-healthcare related costs.<sup>20</sup> Indeed, Arshinoff *et al*<sup>21</sup> found that bilateral same day cataract surgery did not lead to an increase in operative complications when using separate surgical instruments for each eye and any rare negative occurrence may to some degree be offset by potential improvements in outcomes such as a reduction in injurious falls, for example.<sup>6</sup>

While these adaptation challenges led to some participants feeling ‘unbalanced’, none had fallen, and they did not experience any long-term problems. However, we did find evidence of significant and lasting difficulties arising from target refraction, which did not meet some participants’ lifestyle needs. The National Institute for Health and Care Excellence guidelines<sup>22</sup> (NICE 2017) state that the preoperative assessment for cataract surgery should include a discussion of the refractive implications of different intraocular lenses with the patient and the choice of lens should be based on the patient’s chosen refractive outcome. One striking outcome from the research was that this either didn’t happen or patients were not given sufficient time and information to make a truly informed choice and therefore deferred to the professional. This left 27% of participants unhappy with their final refraction, mainly because they were previously myopic and had now lost their ability to read without spectacles. Indeed, it has been shown that patients assume that if they do not require spectacles before surgery, they will not require them

afterwards,<sup>23</sup> so this point needs careful discussion. Kora *et al*<sup>24</sup> found that 62% of high myopes preferred to be left myopic post-surgery, and that it is important to take patient preference into account when selecting post-operative refraction. The timing and contents of this discussion needs careful consideration, as many patients find it difficult to understand the trade-off that they are being asked to make between distance and near vision and that what is considered ‘best vision’ may not be the most suitable choice for their lifestyle. Clinicians should take into account patient preferences for their final prescription and not assume that a plano refraction is the best outcome for all individuals.

Participants were happy with the information that they were given regarding the surgery and the aftercare and this struck a good balance for people who want a lot of information and others who feel overwhelmed by too much. All participants appreciated having written information that they could keep and refer to at a later date and this enabled several patients to feel confident regarding how to deal with some post-surgical complications. Previous research has identified that there can be a lack of information about surgery,<sup>25</sup> which may indicate differences between surgical centres, or that information provision has improved over time. The important exception in our research was a lack of information about when it would be safe to resume driving. Information was either conflicting or absent, leaving patients to rely on their common sense and a belief that their driving ability must improve following surgery, and they would ‘just know’ if they were not safe to drive. However, driving difficulty increases rather than decreases in a significant minority of patients (11%) in the time between first- and second-eye surgery.<sup>26</sup> As Wood *et al*<sup>27</sup> showed that many older drivers lack insight into their own driving ability, this could be problematic, particularly as drivers are very poor at understanding the driving vision standards and the importance of clear vision.<sup>28</sup> Fraser *et al*<sup>26</sup> found that only 22% of patients purchased new prescription spectacles in the period between first- and second-eye surgery and so may be driving with less than optimal vision, which is a concern for road safety. Drivers need to be provided with clear advice about when they can commence driving following surgery. Legally, the DVLA (Driver and Vehicle Licensing Agency) requires patients to read a number-plate from 20m and read 6/12 binocularly,<sup>29</sup> so that patients should get their VA (visual acuity) checked by an optometrist or physician prior to restarting driving after the operation. This advice should include the need to be aware of possible difficulties with binocular vision<sup>30</sup> which can affect certain driving tasks, such as parking and judging the speed of oncoming vehicles.

In considering the results of this study, it is important to consider its strengths and limitations. The qualitative

approach means that we were able to explore participants' experiences in much more detail than would be possible in a survey. However, this limits the number of people who are involved: we cannot make generalisable statements about the incidence of post-surgical adaptation problems based on 26 participants. Nevertheless, we can identify problems that might be missed by survey questions, and also explore the effects of these problems. However, the need to physically attend the focus group meant that people who are less mobile were less likely to attend. This may explain why our participants were a little younger than the population of people who have cataract surgery in the UK, and were also slightly more likely to be female than patients in some of the larger cataract population studies.<sup>31,32</sup> Each of our focus groups were facilitated by both an optometrist and a health psychologist, which allowed us to probe on visual symptoms and also psychological theories of illness perceptions. In addition, because participants' surgery could have been several months, or even years, prior to their involvement in this study, we were reliant on their recollection of any difficulties they experienced and their information needs. It is possible, therefore, that some of their short-term difficulties and information needs were under-reported.

Finally, we used a fieldwork agency to recruit our participants, which means that they did not volunteer as a consequence of either good or bad surgery outcomes. However, we did not have information on the pre- or post-surgical levels of monocular and binocular vision or any co-morbid conditions. Thus, the focus of our research was on participants' reports of their experiences rather than on objective assessments of how much difficulty we would expect their visual performance to present for everyday tasks.

In summary, we have shown that some patients experience short-term adaptation difficulties in between surgery on their two eyes. While they are not generally advised about these potential challenges, a significant minority (~25%) find them troublesome. This difficulty particularly arises between first- and second-eye surgery and patients reported that they developed their own coping strategies regarding their vision. Until same day, bilateral cataract surgery becomes common, clear prescribing guidelines are needed so that clinicians can appropriately advise their patients. There is also an unmet information need about when to start driving following surgery and further research is needed to allow guidelines to be developed. The persistent challenge occurs when patients are given a prescription that is not well suited to their visual needs. In particular, long-term myopes may prefer a post-operative low myopia and the ability to read without spectacles rather than emmetropia. Future research should investigate ways to support clinicians in explaining the differences in refractive

outcomes to patients and helping patients to decide which outcome would best suit their lifestyle.

## Acknowledgements

This work was supported by Dunhill Medical Trust grant number: RTF1806/53.

## Conflict of interest

The authors report no conflicts of interest and have no proprietary interest in any of the materials mentioned in this article.

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### Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Appendix S1** Cataract FG1 Gildersome.

**Appendix S2** Cataract FG2 Gildersome.

**Appendix S3** Cataract FG3 Oakwood.

**Appendix S4** Cataract FG4 Kirkstall.

**Appendix S5** Cataract FG5 Kirkstall.