Cataracts: the essentials for patient care

Penelope Stanford
Senior Lecturer Adult Nursing, University of Manchester; Chair RCN Ophthalmic Nursing Forum
penelope.stanford@manchester.ac.uk

Abstract

It is estimated that over 2.2 billion people globally have a visual impairment. Cataract is one such form of impairment, which can be surgically corrected. However, disruptions in ophthalmic services due to the pandemic have resulted in long wait times—estimated to take up to 5 years to clear. Considering these issues, there is no doubt that individuals affected by the condition will be negatively impacted.

In this article, Penelope Stanford provides information on the anatomy and altered physiology of the crystalline lens, and informs on the essentials of patient care.

Keywords: Cataract • surgery • pre-operative care • post-operative care • district nursing

This article sets out to explain the anatomy, physiology and altered physiology associated with the crystalline lens, cataract and cataract surgery, further informing on nursing care. The World Health Organization (WHO) estimate that 2.2 billion people globally have a vision impairment (2019). Around one billion people have a visual impairment, which could have been prevented or treated (WHO, 2019). Cataract is one such condition, which impairs vision, yet is treated by surgery. Cataract surgery is one of the most frequently performed operations; in 2018/19, 472 000 cataract surgical procedures were performed in England and Wales (Royal College of Ophthalmologists (RCOph), 2020). The mean age of people having cataract surgery in that time was 76 years of age; however, cataracts can affect people at any age.

As with other surgical specialties, elective ophthalmic surgery was suspended due to COVID-19, resulting in excessive waiting lists once services were restored. Post-pandemic, it is estimated that 600 000 people are on an ophthalmology first appointment waiting list, which, taking into account new patients, is estimated to take 5 years to clear (RCOph, 2022a). With this in mind, strategies such as 'Restoration of cataract services after COVID' (RCOph (2020) and High Flow Cataract Surgery (2022b) have been developed and implemented to provide safe and effective care within a streamlined service.

WHO (2019) defines vision impairment as:

'...when an eye condition affects the visual system and one or more of its vision functions.'

Cataracts cause a person's vision to become impaired. A cataract occurs when the normal clear lens becomes opaque, impairing the visual system of the eye's anatomy and its ability to transmit light to the optic nerve where normally it is converted into images in the visual cortex of the brain (Batterbury and Murphy, 2018) .Visual impairment caused by cataracts affect a person's quality of life (WHO, 2022). A study of the global burden of cataracts indicates that characteristics such as sex (women), age, lower social economic status and access to surgery were more likely to have a negative influence on a person's quality of life (Fang et al, 2022). Other factors associated with living with cataracts include social isolation and cognitive health (Hecht et al, 2022). Cataracts are also linked to falls in older people (Tavares et al, 2021).

The crystalline lens

Cataracts are the altered physiology of the crystalline lens. The crystalline lens is so called for its transparency, resulting from its composition of proteins, fibres and predominant state of dehydration (Batterbury and Murphy, 2018). The crystalline lens is situated in the anterior segment of the eye behind the iris and in front of the posterior chamber, which contains structures including the retina and vitreous (Batterbury and Murphy, 2018)

The transparent crystalline lens facilitates the transmission of light rays, creating a retinal image (Ruan et al, 2020) .The lens also has the ability to change shape—a process known as accommodation—which is essential for near vision and far vision (Batterbury and Murphy, 2018). The normal physiological lifelong growth of the lens, combined with ageing (usually from the age of 45 years) of the accommodative flexibility of the lens to change shape decreases over time, leading to presbyopia (Marcos et al, 2021).

What is a cataract?

A cataract occurs when the transparency of the normally clear crystalline lens impedes the transmission of light rays to the back of the eye (Bowling, 2016). The location of the opacity in the lens gives rise to the following classification of cataracts as they appear on examination of the patient's eye (Bowling, 2016):

- Nuclear sclerosis: central lens opacity

- Cortical: opacities appear as spoke-like projections in the cortex of the lens
- Posterior subscapular: opacification on the posterior aspect of the lens, beneath the lens capsule.

Causes of cataracts

Cataracts can be caused due to the following:

- Aging
- Exposure to ultraviolet light
- Smoking
- Congenital
- Trauma (blunt or penetrating)
- Systemic conditions such as diabetes
- Long-term steroid therapy.

Signs and symptoms of cataracts

The signs and symptoms of a cataract are well established (Bowling, 2016; Batterbury and Murphy, 2018; Delbarre, et al 2020). A person with a cataract may experience one or more signs and symptoms depending on its cause and the location of the opacity within the lens. Generally, there is a gradual and painless loss of near/or distance vision. Contrast sensitivity, ability to distinguish between the shades of light and dark, light sensitivity and the glare—these symptoms mean that the patient cannot drive safely and must refrain from doing so. If the cataract is a result of trauma, the loss of vision may be sudden, but can also be a steady loss.

Cataract surgery

Cataract removal is a surgical procedure. The cataract is removed from the capsular bag by small incision surgery such as phacoemulsification or femtosecond laser, replaced with an artificial intraocular lens (Marcos et al, 2021). The operation is quick, and generally takes place under local anaesthetic in a day case setting (Grzybowski et al, 2019).

Patients often receive a cataract diagnosis at a routine eye test at the optometrist/opticians. The process of referral and subsequent cataract surgery is underpinned by the National Institute of Clinical Excellence (NICE) Cataract Guidelines published in 2017. At the time of writing, these are the current guidelines; however, the pandemic has negatively affected patient access to cataract surgery and new ways of working to reduce cataract waiting lists have been developed. One such example is a study by Dhillon et al (2022), which implemented a pilot scheme for one-stop cataract surgical appointments to streamline patient throughput. This approach was aimed at reducing the usual five-step process for low-risk patients, that is, those without systemic or ocular co-morbidities. However, the quality of the patient experience is not explored and, according to Dhillon et al (2022), patients may feel pressured into consenting to cataract surgery if only attending the hospital on the day of the operation.

Pre-operative patient assessment

The aim of cataract surgery is to provide patients with the best possible vision. Patients can expect to gain functional near and far vision (Marcos et al, 2021).

Current NICE (2017) guidelines state that once listed for cataract surgery, a patient should undergo a preassessment. This is an opportunity for a holistic nursing assessment, taking a biopsychosocial approach to patient care. Patients can expect to undergo essential ocular pre-operative tests such as biometry (length of the eye) and keratotomy (power of the cornea) to determine the intraocular lens and potential visual outcome (NICE, 2017; Zhang, 2022). Post-operative nursing care also begins at this stage.

Advances in cataract surgery and local anaesthesia techniques are the impetus for self-care following cataract. Central to post-operative patient self-care is patient education about eye drop instillation, pain management and awareness of potential post-operative complications.

Pre-operative education supports patients to make informed decisions about their care and to be fully aware of their role in post-operative care self-management (Wisley et al, 2022). An individualised approach should inform the mode of patient education. One example is conveying information via video played to patients in the cataract preassessment clinic. Wisely et al (2022) found that overall, patients were receptive to this form of cataract information. Alternatively, Moladoost et al (2021) suggested face-to-face or telephone pre-operative education helpful in reducing anxiety in people undergoing cataract surgery. The best approach is assessed as part of the nurse/patient interaction.

Post-operative patient care

Patients may expect to have their eye covered with a plastic shield known as a cartella, usually if there are residual effects of the local anaesthesia (NICE 2017), as otherwise the patient may not feel any debris, such as dust that may enter the eye. A post-operative cartella may be based on surgeon preference. However, Zhang et al (2022) expressed concerns over the lack of rigorous evidence to suggest why a cartella would not be an appropriate post-operative intervention. Patients who are discharged with a cartella *in situ* can remove and discard it the following morning or as advised in the post-operative information.

In the initial post-operative phase, patients can expect their eye to feel gritty and to be sensitive to bright light. Eyelids may be bruised, conjunctiva (white of the eye) red. Post-operative eye cleansing is not normally needed (but may be suggested in post-operative instructions), unless some slight 'crustiness' the morning following surgery is present. Some patients are given sterile non-linting swabs, normal saline, a sterile gallipot, and a pack of sterile swabs in their discharge pack. Cooled boiled water in place of the normal saline may be recommended.

In the absence of a current evidence base, the following procedure is indicative of expert opinion:

- Wash and dry hands before and after the procedure
- Dip the swab (not saturate) into the saline filled gallipot
- Close the eye and gently wipe from inside to outside, taking care not to touch the eye
- Instil prescribed eye drops.

Eye drops may be prescribed for prevention of post-operative infection and inflammation. The importance of correct and timely post-operative eye drop instillation should be emphasised as part of a patient education plan of care.

Post-operative eye drops

Eye drops may be prescribed for prevention of post-operative infection and inflammation (NICE, 2017; Matossian et al, 2022; RCOph, 2022a). The importance of correct and timely post-operative eye drop instillation should be emphasised as part of a patient education plan of care. Matossian et al (2022) adviced on strategies to promote post-operative eye drop adherence, such as assessing the patient's cognition, handwashing, hand dexterity and hand-to-eye co-ordinations. Ideally, patients/families/carers are taught eye drop instillation as part of preassessment nursing care, which is reinforced before discharge. Patients who already use eye drops, for example, for chronic glaucoma, should have their technique checked.

Box 1. Technique for eye drop instillation: advice for patients

- Wash and dry hands before and after eye drop instillation
- Check eye drop name against the prescription and expiry date
- Generally, once open, eye drops should not be used 28 days after opening
- Find a comfortable position. Some people find it easier to look in a mirror, or lie down on the bed
- Shake the bottle and take off the cap
- Place the drop bottle in dominant hand
- Support with non-dominant hand to prevent the drop bottle going near the eye
- Gently pull down the lower eyelid with non-dominant hand Taking care to place finger away from the eye and eyelashes
- Squeeze the bottle and one drop should enter the eye. If it misses, try again
- Squeeze the bottle and one drop should enter the eye. If it does not then try again
- Any excess eye drops will flow out of the eye without causing harm
- Wait until the excess fluid has reached the cheek then wipe away with a clean tissue
- Some eye drops may sting a little; drops that have been stored in the fridge (according to manufactures guidelines) can also feel uncomfortable for a couple minutes after they have been instilled in the eye.

Technique for safe and effective eye drop installation

Patient education on eye drop instillation should begin in the preassessment phase of care. Patients may not feel confident in eye drop instillation; therefore, a family member or carer may be best placed to support them. There are also eye drop aids available to buy from pharmacists and patients may prefer to use these.

Eye drops are prescribed medications and should be managed as with any other type of medication. Patients should follow the right techniques for instilling eye drops, as advised by an ophthalmologist (*Box 1*).

Some eye drops may sting a little; drops that have been stored in the fridge (according to manufactures guidelines) can also feel uncomfortable for a few minutes after they have been instilled in the eye.

RCOph (2022a) recommend that all patients receive a standardised discharge pack. There may be some local variations, but patients can expect to receive post-operative eye drops and a post-operative information leaflet.

Examples of prescribed post-operative eye drops, according to RCOph (2022a), are:

- Chloramphenicol (*without preservative if patient has a preservative allergy) (stored in a fridge) 4 times a day, for weeks 1 and 2
- Dexamethasone 0.1% (*without preservative if definite preservative allergy) 4 times day for 2 weeks then twice a day for 2 weeks.

Patients and carers may find charts (*Table 1*) a useful aid memoire, which may be included in a post-operative information leaflet.

The effectiveness of eye drop instillation and adherence to short-term regimes is necessary to prevent post-operative complications such as infection (e.g., endopthalmitis). Endopthalmitis is an acute infection acquired during the

surgical procedure, due to microorganisms entering the eye (Batterbury and Murphy, 2018). In the UK, there is a 0.14% incidence of post-operative endopthalmitis following cataract surgery (RCOph, 2022a). Moreover, this can have devastating consequences for the patient's eyesight and well-being and is an ophthalmic emergency (NICE, 2017; NHS England 2020; RCOph, 2022).

Post-operative cataract advice

Patients can continue to:

- Enjoy hobbies, such as watching the television and reading
- Shower as usual and wash their hair
- Continue with activities such as going to the gym, lifting, bending down
- Return to work 2 days post-operatively if feeling comfortable to do this (NHS England, 2020).

Patients should avoid:

- Putting their head under water
- Using mascara
- Rubbing their eye.

Patients are advised to:

- Wear sunglasses, if experiencing light sensitivity
- Be aware that if facemasks are worn, the mask should be clean and must not meet the eye or surrounding area
- Drive if feeling confident, have no double vision, can see a car number plate at 20 meters and comply with the normal Driver and Vehicle Licensing Agency standards for driving (NHS England, 2020).

Post-operative complications

As with all surgical procedures, cataract surgery is not without the risk of post-operative complications. The self-care approach advocated earlier in this article will empower patients to recognise and seek advice, should they experience any of the following (Grzybowski, and Kanclerz, 2019):

- Pain: acute/persistent
- Nausea/vomiting
- Reduced/change in vision
- Discharge around the eye.

Depending on local arrangements, patients can be directed to an ophthalmic nurse-led telephone triage unit, emergency centre, or to their optometrist/minor eye care services for advice. NICE (2017) recommend that measures should be in place to assess patients for post-operative complications. However, they do not advocate next day in-person assessment for patients who had an uneventful surgery. Recently, alternative post-operative reviews were explored. There is evidence to suggest post-operative review of patients following cataract surgery is not always necessary. Unless a complicated case, patients have a (no cost) sight test by their local optometrist who will check healing and assess for and prescribe new glasses and/or are referred for second eye cataract surgery (RCOph, 2022a).

Table 1. Example of an eye drop aid memoire chart

Day	Eye drop: Chloramphenicol Dexamethasone 0.1%	8am	12pm	4pm	8pm
1					
2					
3					
4					
5					
6					
7					

Patients who have experienced perioperative complications, or have ocular co-morbidities such as chronic glaucoma or diabetic eye disease, will require a post-operative review. Grzybowski et al (2019) and Al-Ani et al (2022) recognised the implications of the pandemic combined with advances in surgical technology as potential to improve the patient experience. A nurse or optometrist conducted telephone post-operative assessments with suitable patients, including pain and eye drop instillation. Al-Ani et al (2022) concluded the telephone assessments were safe, offered patient convenience and were a favourable use of healthcare resources. This approach is integral to current UK practice (RCOph, 2022a). This entails a 24 hour, 7-day telephone triage service led by ophthalmic care professionals who have the knowledge and expertise to identify and understand signs and symptoms indicative of post-operative complications and provide access to emergency treatment.

The role of the district nurse

The district nurse has a role in both pre- and post-operative patient care. Developing awareness of the basic eye anatomy and the effect of a cataract on a person's vision and psychological well-being will inform a biopsychosocial approach to patient care.

As previously mentioned, the waiting lists for cataract surgery at time of writing this article are excessive and this waiting period is psychologically and physically challenging for the patient. Visual impairment causes social isolation and with it comes low mood and depression. This is exacerbated by waiting for a date for surgery. The patient is also at risk of falls due to impaired vision and falls prevention interventions are important for patient

safety. Patients can expect their vision to improve gradually. Therefore, district nurses should continue to assess falls risks as the patient's vision may be imbalanced and/or may have a cataract in the operated eye.

Post operatively, the district nurses can support the patient with eye drop instillation and be aware of the signs of post-operative complications so that the patient and the district nurses are directed to the local ophthalmic telephone triage service, as indicated in the post-operative information leaflet.

The Royal College of Nursing Ophthalmic Nursing Forum (2022) have published an information source for non-ophthalmic healthcare professionals. District nurses will find this useful to inform their knowledge and understanding of the care of the patient with an ophthalmic condition.

Conclusion

As cataract surgery is the most frequently performed surgery globally and in the UK, it seems likely that nurses working in all contexts will encounter patients who may need or who have had their cataracts removed.

Nurses should have an understanding of the effects of cataracts on a person's quality of life in order to provide appropriate interventions such as falls prevention. For most people, cataract surgery is a relatively uneventful experience. However, awareness of potential post-operative complications will allow nurses to advocate for the patients in their care, should the need arise. **BJCN**

Accepted for publication: April 2023

Declaration of interest: None

Key points

- The crystalline lens plays an important part in a person's vision, and when the lens loses its transparency due to a cataract, there are a range of biopsychosocial impacts for the patient
- Cataract surgery is normally a short surgical procedure, however robust pre, peri and postoperative care is essential for optimum patient outcomes
- Prevention of infection and empowering patients, their family/carers to seek prompt advice if needed are integral to the role of the community nurse.

CPD reflective questions

- Which parts of the anatomy and physiology discussed in this paper will inform your practice?
- Think about the patients in your current caseload; are any waiting for cataract surgery? How does this affect their activities of daily living?
- How can eye drop instillation be integrated into a patient-centred nursing care plan?

Al-Ani HH, Li S, Niederer RL. Telephone follow-up one day post-cataract surgery. Clin Exp Optom. 2022; 4:1-5. https://doi.org/10.1080/08164622.2022.2146482

Batterbury M, Murphy C. Ophthalmology: an illustrated colour text. 4th edn. Elsevier; 2018

Bowling B. Kanski's clinical ophthalmology: a systematic approach. 8th edn. Elsevier; 2016

Delbarre M, Froussart-Maille F. Sémiologie et formes cliniques de la cataracte chez l'adulte [Signs, symptoms, and clinical forms of cataract in adults]. J Fr Ophtalmol. 2020;43(7):653-659. https://doi.org/10.1016/j.jfo.2019.11.009

Dhillon N, Ghazal D, Harcourt J, Kumarasamy M. A proposed redesign of elective cataract services in Scotland - pilot project. Eye (Lond). 2022;36(11):2116-2121. https://doi.org/10.1038/s41433-021-01810-9

Fang R, Yu YF, Li EJ, Lv NX, Liu ZC, Zhou HG, Song XD. Global, regional, national burden and gender disparity of cataract: findings from the global burden of disease study 2019. BMC Public Health. 2022;22(1):2068. https://doi.org/10.1186/s12889-022-14491-0

Grzybowski A, Kanclerz P, Huerva V, Ascaso FJ, Tuuminen R. Diabetes and phacoemulsification cataract surgery: difficulties, risks and potential complications. J Clin Med. 2019a;8(5):716. https://doi.org/10.3390/jcm8050716

Grzybowski A, Kanclerz P. Recent developments in cataract surgery. Current concepts. Ophthalmology Springer. 2019: 55-97.

Hecht I, Kanclerz P, Tuuminen R. Secondary outcomes of lens and cataract surgery: More than just "best-corrected visual acuity". Prog Retin Eye Res. 2022:101150. https://doi.org/10.1016/j.preteyeres.2022.101150

Kamdi MP, Ankar MR, Narayane M, Bhirange S. To assess the impact of proposed teaching programme on post-operative self-care among cataract patients. J med Pharm Allied Sci [Internet], 2021;10(3):2997-3000.

Kanclerz P, Tuuminen R. Advancements in post-operative care after cataract surgery. J Clin Med. 2022;11(11):3162. https://doi.org/10.3390/jcm11113162

Marcos, S, Martinez-Enriquez, E et al. Simulating outcomes of cataract surgery: important advances in ophthalmology. Annu Rev Biomed Eng. 2021; 23(1):277-306

Matossian C, Crowley M, Periman L, Sorkin S. Personalized management of dry eye disease: beyond artificial tears. Clin Ophthalmol. 2022;16:3911-3918. https://doi.org/10.2147%2FOPTH.S384819

Moladoost A, Salehi A, Farzi S, Dehghani A, Razmjoo ZA, Farzi S. The effects of an interdisciplinary supportive educational programme on anxiety in patients undergoing cataract surgery Nurs Midwif Stud. 2021;10(3):145-150

National Institute for Health and Care Excellence. Cataracts in adults: management. 2017. https://www.nice.org.uk/guidance/ng77 (access 3 April 2023)

NHS England. Patient information. post-operative cataract care. 2020. https://www.gettingitrightfirsttime.co.uk/wp-content/uploads/2021/03/Post-operative-cataract-leaflet-v1.1-22.09.20.pdf (access 3 April 2023)

Royal College of Nursing. Eyes right: helping non-ophthalmic healthcare professionals deliver quality care safely. 2022. https://www.rcn.org.uk/Professional-Development/publications/eyes-right-uk-pub-010-160 (accessed 3 April 2023)

Royal College of Ophthalmologists. Restoration of cataract services. 2020. https://www.rcophth.ac.uk/wp-content/uploads/2020/08/RCOphth-GIRFT-COVID-19-Resumption-Of-Cataract-Services_August2020.pdf (accessed 3 April 2023)

Royal College of Ophthalmologists. Managing an outbreak of post-operative endopthalmitis. 2022a. https://www.rcophth.ac.uk/wp-content/uploads/2016/07/Managing-an-outbreak-of-post-operative-endophthalmitis-Final-2022.pdf (accessed 3 April 2023)

Royal College of Ophthalmologists. Ophthalmic services document high flow cataract surgery version 2.0:VS January 2022. 2022b. https://www.rcophth.ac.uk/wp-content/uploads/2022/02/High-Flow-Cataract-Surgery_V2.pdf (accessed 3 April 2023)

Ruan X, Liu Z, Luo L et al. Structure of the lens and its associations with the visual quality BMJ Open Ophthalmology 2020;5:e000459. http://dx.doi.org/10.1136/bmjophth-2020-000459

Tavares DMDS, Oliveira NGN, Oliveira NN, Ikegami ÉM. Factors associated with the occurrence of falls among older people with and without cataracts: Structural equation modelling analysis. J Clin Nurs. 2021;30(17-18):2634-2645. https://doi.org/10.1111/jocn.15640

Wisely CE, Robbins CB, Stinnett S, Kim T, Vann RR, Gupta PK. Impact of pre-operative Video Education for Cataract Surgery on Patient Learning Outcomes. Clin Ophthalmol. 2020;14:1365–1371. https://doi.org/10.2147%2FOPTH.S248080

World Health Organization. World report on vision. 2019. https://www.who.int/publications/i/item/9789241516570 (accessed 3 March 2023)

World Health Organization. Blindness and Vision Impairment Key Facts. 2022. https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment (accessed 3 March 2023)

Zhang JH, Ramke J, Lee CN, Gordon I, Safi S, Lingham G, Evans JR, Keel S. A Systematic review of clinical practice guidelines for cataract: evidence to support the development of the WHO package of eye care interventions. Vision (Basel). 2022;6(2):36. https://doi.org/10.3390/vision6020036