

Nursing Management of Children Undergoing Cataract Surgery: A Review Article

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ABSTRACT

Background:

Pediatric cataract is a leading cause of preventable childhood visual impairment and can be treated with early diagnosis and surgical intervention. However, successful recovery and long-term vision preservation depend not only on the surgical procedure but also on comprehensive perioperative care. Nursing management plays a pivotal role in ensuring the safety, comfort, and well-being of children undergoing cataract surgery. Nurses are central to preoperative preparation, parental education, emotional support, postoperative monitoring, medication administration, and adherence to follow-up and amblyopia therapy. Their role is particularly crucial in pediatric cases due to the unique anatomical, developmental, and emotional needs of children. This review highlights the importance of skilled nursing care as an integral component of a multidisciplinary approach to pediatric cataract management, aiming to reduce complications, enhance visual rehabilitation, and support families throughout the treatment journey.

Keywords: Pediatric cataract, Nursing management, Cataract surgery

INTRODUCTION

Pediatric cataract is recognized as one of the leading causes of preventable childhood blindness worldwide. It accounts for approximately 5% to 20% of all cases of childhood blindness, with substantial variation based on geographic location, healthcare accessibility, and socioeconomic status. Globally, the estimated prevalence ranges from 1 to 15 cases per 10,000 children, with the burden significantly higher in low- and middle-income countries (Mendoza-Moreira et al., 2024). In the United Kingdom, the reported prevalence of pediatric cataract is approximately 3.18 per 10,000 live births (Gupta et al., 2024).

Types and causes of cataracts in children

Cataracts can arise from various causes, including genetics, metabolic disorders, trauma, and intrauterine infections. Congenital cataracts may be unilateral or bilateral and are linked to maternal infections, poor nutrition, and placental hemorrhage. While age-related cataracts are most common, trauma is a leading cause of unilateral cataracts in young adults. Electric shock, UV radiation, ionizing radiation, and chemical exposure are rare but recognized contributors (Nizamil et al., 2024).

Cataracts may appear in different parts of the lens and range in size from tiny dots to dense clouds. Genetics, metabolic disorders like diabetes, and eye injury can all cause cataracts. Many times, the cause of cataracts in a child is not known. Pediatric cataract types include those associated with systemic conditions like Down syndrome, Marfan syndrome, hypothyroidism, TORCH infections, and more, impacting surgical outcomes and postoperative care (Mukamal et al., 2022, and Kshitij et al., 2023).

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Congenital cataract is the most common treatable cause of blindness in infancy, accounting for 5% to 20% of childhood blindness globally. Unilateral cataract is reported in approximately 19.6% to 55.5% of pediatric cases. However, delayed detection and treatment can lead to irreversible visual impairment (Pauline et al., 2024). Additionally, inherited cataracts are frequently associated with mutations in genes responsible for essential lens functions (Shiels & Hejtmanic, 2019).

Traumatic cataracts frequently develop following blunt or penetrating injuries to the eye. Up to 65% of eye traumas lead to cataract formation, resulting in significant short- and long-term vision loss. Most cases of ocular trauma result in some degree of lenticular swelling. The severity of the trauma and the integrity of the capsular bag determine the type of cataract developed and the clinical course. Traumatic cataracts may occur acutely or develop slowly over time, as in the case of a concussion cataract (Okoye and Gurnani, 2023). In children, pediatric traumatic cataracts are most frequently observed in primary school-aged children, especially following open-globe injuries. In developing countries, ocular trauma accounts for up to 45% of childhood cataracts, highlighting the significance of preventive strategies, such as public health education and injury prevention programs, targeting this vulnerable age group (Kedwany et al., 2021).

Complications:

Untreated paediatric cataracts can lead to permanent vision loss due to disrupted brain eye connections during critical visual development. Early detection is essential congenital cataracts should be screened at birth, while acquired cataracts often arise later and are diagnosed via vision screening or post injury (Mukamal et al., 2022). Traumatic cataracts may form immediately or long after injury. Rapid formation can occur from lens capsule rupture, increasing the risk of amblyopia. Urgent cataract extraction is needed in cases of capsule rupture, lens material in the anterior chamber, or secondary complications like glaucoma. If stable, delayed surgery may be appropriate (Cobbs, 2024).

Management of Paediatric Cataract

Prevention is key in reducing pediatric cataract incidence. Strategies include maternal vaccination and infection control during pregnancy against rubella, toxoplasmosis, CMV, varicella, and HSV. School-based safety education can also reduce trauma-related cases (Kedwany et al., 2021). Effective management requires a multidisciplinary approach, including early detection, timely surgery, and consistent postoperative and visual rehabilitation care. Socioeconomic barriers—such as low health literacy, parental stress, and limited access—can delay care and worsen outcomes. Addressing these disparities calls for standardized care, better communication, and policy-level support (Ahmad & de Alba Campomanes, 2023).

Pediatric cataract management differs from adults due to immature ocular structures and ongoing eye growth. While surgery is often necessary, small or partial cataracts may be observed. Phenylephrine or tropicamide can aid vision by dilating pupils, but atropine is avoided due to its amblyogenic effect. In unilateral or asymmetric cases, part-time occlusion of the dominant eye may prevent amblyopia. These conservative approaches can delay surgery until eye growth stabilizes, reducing post-IOL refractive errors (Dhiman et al., 2022; Iwata, 2024; Math & Barki, 2023).

Diagnostic studies:

External examination assesses the eye without specialized instruments, with visual acuity being a key focus. Visual acuity refers to the eye's ability to resolve fine detail and is measured against a standard of normal vision. In children, assessment can be challenging and requires age-appropriate charts, including those with letters, pictures, or patterns (Daiber & Gnugnoli, 2023; Saluja, 2024; Vimont, 2024).

According to guidelines by the American Academy of Ophthalmology and the American Association for Pediatric Ophthalmology and Strabismus, vision screening is recommended at specific developmental stages: newborns, 6 to 12 months, 1–3 years, 3–5 years, and after 5 years. Normal age-specific visual acuity milestones are as follows: Birth—6/120 (20/400), 4 months—6/60 (20/200), 6 months—6/36 (20/120), 1 year—6/18 (20/60), and 2 years—6/6(20/20) (Saluja, 2024).

Red reflex testing is a quick, non-invasive screening method used to detect visual axis abnormalities such as cataracts or corneal opacities. It is performed in a dark room using a direct ophthalmoscope. A normal red reflex appears as a symmetrical reddish glow; an absent or black reflex may suggest an obstruction like a cataract (Nguyen & Blair, 2023).

Internal eye examination uses specialized tools to assess cataracts and detect deeper abnormalities. The slit lamp, after dilation, confirms cataract type and extent. If the fundus is obscured, a B-scan helps identify conditions like retinal detachment or posterior

tumours (Leonardi, et al., 2020& Vimont, 2024). For young children, direct ophthalmoscopy checks the red reflex when slit lamp use is not feasible (Buratto, et al., 2024).

Surgical Intervention and Postoperative Care

Surgical intervention is recommended for visually significant pediatric cataracts, especially with central opacity >3 mm, strabismus, or nystagmus. Unilateral cataracts should be treated between 4–6 weeks, and bilateral cataracts by 6–8 weeks, one eye at a time. General anesthesia is used in young children; older, cooperative children (>10 years) may receive local anesthesia. Postoperative care includes follow-ups at day 1, week 1, and month 1, with antibiotic and anti-inflammatory drops. Steroids and IOP-lowering drops are adjusted as needed. Visual rehabilitation is crucial, and posterior capsule opacification may require laser or vitrectomy (Cobbs, 2024).

Early postoperative complications following pediatric cataract surgery include wound leakage, elevated intraocular pressure, vitreous or retinal hemorrhage, retinal detachment, endophthalmitis, cystoid macular edema, and inflammation due to heightened tissue reactivity. **Late complications** may develop weeks to months later and include visual axis opacification, secondary glaucoma, retinal detachment, and amblyopia (Heidar & Tripathi, 2024).

Nursing management for children undergoing cataract surgery

Preoperative nursing management

Pre-operative preparation is the first stage in the enhanced recovery process after ophthalmic surgery; if it goes wrong, it will adversely impact the pre- and post-operative stages of enhanced recovery, and if done well, it will enable enhanced recovery. First, care during acute episodes (assess the pain, medication administration, and learn about activity restrictions); second, educate the patient and caregivers about the aspects of ophthalmic management and self-care practices. (Mafi et al., 2019).

Nurses working in the surgical wards should be more sensitive towards patients' and caregivers' psychological needs. The nurses should also spend more time discussing patient and caregiver concerns and assessing their learning needs. Orient the patient and caregiver and explain procedures and the care plan to decrease anxiety. The nurse assesses the patient's and caregiver's learning needs preoperatively, and individualized teaching is given based on each patient's learning needs. If outpatient surgery is planned, the nurse explains and provides a written list of preoperative preparation that the client is to perform (Obuchowska and Konopinska, 2021).

The nurse needs to ask the patient or his caregiver about the history of taking medication because some medications, such as alpha-antagonists, can interfere with pupil dilation during surgery, resulting in miosis and iris prolapse. Nurses in the ambulatory surgery setting give patient and caregiver education about eye medications (antibiotic, corticosteroid, and anti-inflammatory drops) that will need to be administered to prevent postoperative infection and inflammation. The patient should have no food or fluids for approximately six to eight hours before surgery (Garcia et al., 2021).

Administer preoperative eye drops as antibiotics, mydriatic eye drops, and other prescribed medications. Instruct patients not to touch their eyes to decrease contamination. On the day of the operation, 30 minutes preoperatively, the pupils were dilated by topical application, and antibiotics may be used before surgery (Singh et al., 2021).

Postoperative nursing management for patients undergoing ophthalmic surgeries

Prophylaxis against endophthalmitis is highly recommended due to the severity of these complications, so that immediately after the surgery is completed, the nurse administers an antibiotic, gentamicin, or an antibiotic plus steroid ointment and dexamethasone. Patients are positioned on their back in semi-Fowler position, on the non-operative side, or in the mother's lap. The nurse takes and records vital signs according to institutional policy. In addition, note the patient's level of consciousness and orientation (Abid et al., 2018 & Buratto et al., 2024).

Activities to be avoided are instructed by the nurse. The patient returns from the surgery wearing protective eye patches to prevent accidental rubbing or poking of the eye for 24 hours after surgery, followed by eyeglasses worn during the day and a metal shield worn at night for 1 to 4 weeks. The ophthalmologist usually performs the first dressing change and examines the eye with a slit-lamp microscope. The nurse notes the patch and increased drainage and reports to the surgeon immediately (Chadwick and Lockington, 2021).

Role of nurse in health education and self-care activities

Ophthalmic nurses have an important role as educators and advisors. The ophthalmic nurses should actively engage in lifelong learning to maintain and improve the highest standards of care. Fundamental goals in ophthalmic nursing should include the preservation of vision and the prevention of further visual loss (**Zhang et al., 2021**).

The nurse must instruct the patient and caregiver on the condition of the eye after surgery, the availability and affordability of medications, compliance with medication schedules, and compliance with follow-up visits. Patients' compliance with long-term follow-up is important to provide continued monitoring of the IOP and visual fields and prevent late postoperative complications (**Stanford and Ewing, 2021**).

The nurse should instruct the patient to remain in the prescribed position, such as semi-Fowler's position, on the other operated side or in the mother's lap. Limit activity by sitting on a chair, resting on the bed, and walking to the bathroom to allow the wound more time to strengthen before any physical strain (**Gelatt et al., 2021**).

Eye pads are used to protect the eye and occasionally for comfort when photophobia or lacrimation is excessive. Eye pads are applied after the eyes have been cleansed, examined, and treated. The eye pad is held in position, and the tape is applied. Secure the pad with two or more strips of tape applied downward and diagonally from the mid-forehead to check. The downward movement facilitates lid closure, and the diagonal position of the tape permits facial muscle movement. The eye is examined when the pad is removed, and the pad must be inspected for signs of infection or hemorrhage before being discarded (**Chadwick and Lockington, 2022**).

The nurse should assess bowel habits, provide dietary consultation if needed, and administer vitamin (C, A, B) and mineral supplements as ordered by the physician and encourage the mother to feed her child breast milk or formula as she tends to feed. Advise the patient who had ophthalmic surgery to eat soft, easily chewed food until healing is complete to avoid tearing from excessive facial movement (**Bicket et al., 2021**).

Home care is essential after ophthalmic surgeries. Home care includes protection of an operating eye with an eye shield to protect the eye from accidental injury and not to rub the eye; instruction to wear sunglasses while outdoors during the day because the eye is sensitive to light; when sleeping, lying on the back or side or on the face in retinal detachment; washing hands before and after instilling eye medications; and limitation on eye makeup during the postoperative period is also common (**Adugbire and Aziato, 2018**).

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