Cataract Epidemiology and Prevention: Strategies for Reducing Global Burden

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ABSTRACT
Cataract, characterized by the clouding of the eye's clear lens, is the leading cause of blindness worldwide. To achieve optimal image quality on the retina, the human lens and cornea must first refract light accurately. With aging, the human lens undergoes physical, biochemical, and morphological changes, leading to opacification. The primary mechanisms of cataract formation involve the modification, aggregation, and precipitation of crystallins. While most cataracts result from age-related degeneration, they can also arise secondary to trauma or as a consequence of other diseases, though cataracts are rare in children. This review article provides an in-depth examination of the anatomy and physiology of the lens, different types of cataracts—including diabetic, pediatric, and age-related cataracts—and the management of cataracts through surgical and pharmacological treatments.

INTRODUCTION

Cataract is the most prevalent cause of blindness among the elderly globally, especially in underdeveloped countries. Approximately 20 million people globally are blinded due to age-related cataracts. When cataracts begin to interfere with daily activities, surgery to replace the clouded lens with an artificial one has become the standard treatment. However, this surgery is not always accessible, particularly in low- and middle-income countries. Additionally, cataract surgery can negatively impact patients' quality of life and place a significant burden on healthcare systems by increasing the risk of vision-related issues such as posterior capsule opacification, especially in infants and young children.

Uncorrected refractive error was the leading cause of moderate to severe visual impairment globally, followed by cataracts, which was the primary cause of blindness worldwide. This ranking based on frequency remained consistent from 1990 to 2010. However, regional differences in the causes of blindness were evident. In 2010, cataract-related blindness rates ranged from 15% or less in high socioeconomic regions to over 40% in South and Southeast Asia and Oceania. Similarly, the lowest rates of moderate to severe vision impairment due to cataracts were found in wealthier regions (13.0–13.8%), while the highest rates were in South and Southeast Asia (both over 20%).

Oxidative damage to the eye lens is believed to be a key factor in the onset and progression of cataracts, although the exact mechanisms are unclear. Various reactive oxygen species (ROS), such as hydrogen peroxide (H2O2), superoxide anion (O2), nitric oxide (NO), and hydroxyl radicals (OH-), have been linked to different types of cataract formation. As a result, significant efforts have been made to identify effective antioxidant drugs.

From a public health perspective, cataract-related blindness is a significant challenge for doctors and ophthalmologists. Surgery is the only treatment option, which imposes a substantial financial burden on society. Consequently, strategies have been developed to reduce the impact of this issue by identifying and potentially modifying factors that could prevent the disease or at least delay its onset by up to 10 years. This approach has been observed to reduce the frequency of surgeries by 45% or more. Therefore, preventive medicine has become a focal point in addressing cataract issues. [1]

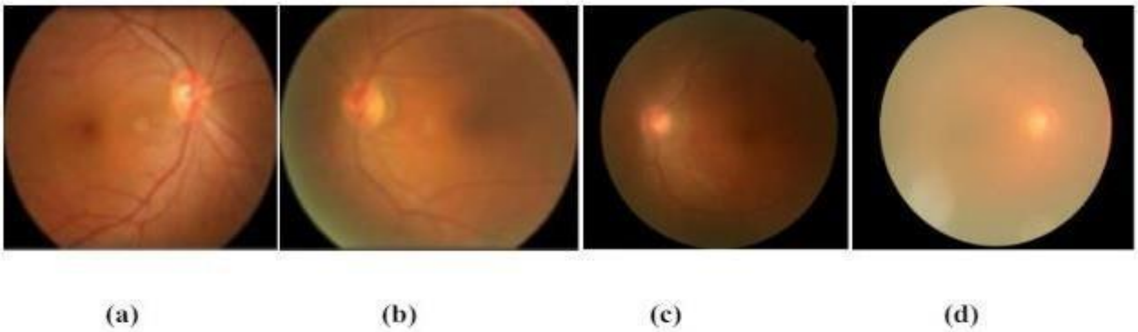

Figure 1: Image For normal and Cataract stage a) Normal b) Mild c) Moderate d) Sever

HISTORY

Cataract surgery dates back to ancient times, with the Ayurvedic physician Susruta describing the procedure in the 5th century BCE in the Sushruta Samhita in India. His methods emphasized hygiene, with follow-up care involving bandaging the eye and covering it with warm butter. In Ancient Rome, references to cataract treatment appear in Aulus Cornelius Celsus's De Medicinae (29 AD), and archaeological evidence also supports the practice of eye surgery during that era.

Galen of Pergamon, a Greek physician from the 2nd century CE, performed a cataract operation similar to modern techniques, using a needle-shaped instrument to remove the affected lens. Around 1000 CE, Muslim ophthalmologist Ammar Al-Mawsili wrote about his invention of a syringe and cataract extraction technique in The Book of Choice in Ophthalmology. In 1468, Abiathar Crescas, a Jewish physician, famously restored the eyesight of King John II of Aragon by removing his cataracts. [2]

EPIDEMIOLOGY

According to the 2010 Global Burden of Disease Study and various meta-analyses, there were 32.4 million people globally who were blind (visual acuity less than 3/60, with 60/60 being normal vision) and 191 million people who were visually impaired (visual acuity less than 20/60 but at least 3/60) in 2010. Worldwide, cataracts were the primary cause of blindness, followed by uncorrected refractive errors. Uncorrected refractive errors were also the leading cause of moderate to severe visual impairment, with cataracts being the second most common cause. This ranking remained unchanged between 1990 and 2010.

However, significant regional differences in the causes of blindness were evident. In 2010, cataracts accounted for less than 15% of blindness in high socioeconomic regions but over 40% in South and Southeast Asia and Oceania. Similarly, the percentage of moderate to severe visual impairment due to cataracts was lowest in higher socioeconomic regions (13.0–13.8%) and highest in South and Southeast Asia (both over 20%). Across all regions, a higher percentage of blindness (35.5% compared to 30.1%) and moderate to severe visual impairment (20.2% compared to 15.9%) from cataracts was observed in women compared to men. [3]

RISK FACTOR

Factors that elevate the risk of developing cataracts include:

1. Advancing age
2. Diabetes
3. Excessive exposure to sunlight
4. Smoking
5. Obesity
6. Family history of cataracts
7. Past eye injuries or inflammation
8. Previous eye surgeries
9. Long-term use of corticosteroid medications

1) **Heavy alcohol consumption.** [4]

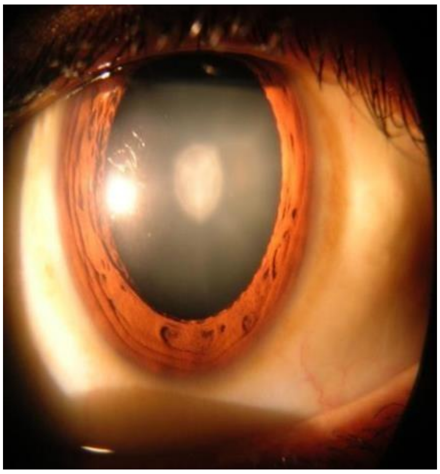

Figure 2: Cataract

PATHOPHYSIOLOGY

The lens consists of specialized proteins called crystallins, whose optical characteristics depend on the precise arrangement of their three-dimensional structure and hydration levels. Membrane protein channels sustain osmotic and ionic equilibrium in the lens, while the lens cytoskeleton shapes the lens cells, particularly the fiber cells in the nucleus. Protein-bound sulfhydryl (SH) groups of the crystallins are shielded from oxidation and cross-linking by high levels of reduced glutathione, often dubbed the "master antioxidant." The molecular makeup, along with the tertiary and quaternary structures of these proteins, ensures high spatial and temporal stability, especially in larger crystallins that can absorb radiation energy (visible light, ultraviolet, and infrared) over extended periods without significantly altering their optical properties. This stability also protects various enzymes involved in carbohydrate metabolism.

As aging progresses, oxidative stress increases, indicating an imbalance between the systemic presence of reactive oxygen species and the body's ability to detoxify these reactive intermediates or repair the resulting damage. Disruptions in the normal redox state of cells can result in toxic effects through the production of peroxides and free radicals, which damage all cell components, including proteins, lipids, and DNA. It is widely recognized that oxidative stress plays a critical role in the development of senile cataracts (the most common type of cataract), as evidenced by studies on experimental animals and cultured lens models. The oxidative processes intensify with age in the human lens, and the concentration of proteins is significantly higher in opaque lenses. This leads to the breakdown and aggregation of proteins and culminates in damage to fiber cell membranes. Additionally, in the aging eye, barriers develop that prevent glutathione and other protective antioxidants from reaching the lens nucleus, making it more susceptible to oxidation.

Furthermore, aging generally decreases the metabolic efficiency of the lens, increasing its vulnerability to harmful factors. Aging creates conditions that allow cataract-inducing factors to act and interact, leading to the formation of various cataracts, many of which are associated with high protein-related light scattering and discoloration. Due to aging, the glucose metabolic pathway functions less efficiently, making protein synthesis, transport, and membrane synthesis challenging. Moreover, the metabolic function of the denucleated fiber cells must be maintained by the epithelium and the small group of fiber cells that still retain their metabolic functions. This results in a steep metabolic gradient from the inside out, complicated by the lens's tendency to isolate damaged fiber cells, leading to wedge or sectorial cataract formation. All lens epithelial cells are exposed to light and radiation stress, leading to genetic alterations. Since defective cells cannot be removed, they are either degraded (by apoptosis or necrosis) or moved to the posterior capsular area, contributing to posterior subcapsular cataracts (PSC).

The enzyme aldose reductase catalyzes the reduction of glucose to sorbitol through the polyol pathway, a process linked to diabetic cataract development. Extensive research has highlighted the key role of the aldose reductase pathway in diabetic cataract formation. It has been demonstrated that the intracellular accumulation of sorbitol causes osmotic changes, leading to the degeneration of hydropic lens fibers and the formation of sugar cataracts. In the lens, sorbitol is produced more rapidly than it is converted to fructose by the enzyme sorbitol dehydrogenase. Additionally, the polar nature of sorbitol prevents its intracellular removal through diffusion. The increased accumulation of sorbitol creates a hyperosmotic effect, resulting in an inflow of fluid to balance the osmotic gradient. Animal studies have shown that aldose reductase-mediated intracellular accumulation of polyols leads to the collapse and liquefaction of lens fibers, ultimately resulting in lens opacities. These findings have led to the "Osmotic Hypothesis" of sugar cataract formation. Oxidative stress and osmotic imbalance can also result from nutritional and trace metal deficiencies, smoking, exposure to toxic substances (including drug abuse and alcohol), and radiation (ultraviolet, electromagnetic waves), all of which can contribute to cataract formation. The exact pathophysiology of these risk factors, however, is not fully understood. [5]

Aetiology	**Examples**
Idiopathic	About 50%
Genetic	Genes encoding Crystallin (CRYA, CRYB, CRYG)
	Genes encoding membrane proteins (GJA3, GJA8, MIP, LIM2)
	Genes encoding cytoskeletal proteins (BFSP1, BFSP2)
	Genes encoding transcription factors (HSF4, PITX3, MAF, PAX6, FOXE3)

Hereditary	Autosomal dominant
	X-linked
	Autosomal recessive
Chromosomal	Trisomy 21 (Down's)
	Trisomy 18 (Edward)
	Trisomy 13 (Patau)
Ocular anomalies	Microphthalmia
	Aniridia
	Retinopathy of prematurity
	Anterior segment dysgenesis syndrome
Others	Trauma
	Radiation induced
	Uveitis or acquired infection (juvenile idiopathic arthritis, Toxocara canis)

Table: Causes of congenital or development cataracts in childhood TYPES OF

CATARACTS

Pediatric cataract:

Pediatric cataract is a major surgically treatable cause of infant blindness, significantly impacting social outcomes by preventing "lost years of blindness." The morphology of cataracts is crucial for visual prognosis, with zonular cataracts having the best outcomes, while thick central cataracts perform poorly. These cataracts can be congenital or acquired, associated with conditions like Trisomy 21, metabolic cataracts, congenital rubella, and trauma. Various types include zonular cataracts, which affect one or more lens layers and are often inherited, sutural cataracts involving lens sutures, and anterior polar and pyramidal cataracts resulting from lens vesicle detachment. Anterior lenticonus, linked to Alport's syndrome, and posterior lenticonus, causing thinning and bowing of the posterior lens capsule, are also noted. Pediatric cataracts can vary in size, location, and density, influenced by genetic and metabolic conditions like diabetes.

Included subtypes that are:

Zonular cataract: Most common; affects one or more lens layers; typically inherited or idiopathic.

Sutural Cataract: Involves lens sutures; often familial.

Anterior Polar and Pyramidal cataracts: Result from lens vesicle detachment.

Anterior lenticonus: Associated with Alport's syndrome.

Posterior Lenticonus: Causes thinning and bowing of the posterior lens capsule; may lead to astigmatism or cataracts.

Age-Related cataract:

Age-related cataract, also known as senile cataracts, develops in adults over 50 years old without being directly caused by recognized mechanical, chemical, or radiation stressors. This condition becomes more prevalent and severe with advancing age and can be categorized into three main types: nuclear, cortical, and posterior subcapsular cataracts. Nuclear cataracts are characterized by the compression and hardening of the lens nucleus, a process known as nuclear sclerosis, which leads to gradual yellowing and vision impairment over many years. This type of cataract can sometimes result in a "second sight," where myopic shifts improve near vision temporarily. Cortical cataracts involve the outer layers of the lens, where new fibers are added without the loss of older ones, potentially leading to discrete opacities known as cortical spokes. When these opacities affect the visual axis or the entire cortex, the lens turns white and becomes mature, although these changes often do not cause significant visual symptoms initially. Posterior subcapsular cataracts, characterized by granular opacities in the central posterior cortex, frequently impair near vision more than distance vision and are often associated with glare issues, particularly while driving at night. As the lens ages, it undergoes thickening and the accumulation of chromophores and fluorophores, which contribute to the lens's yellowing and potential cataract formation. The ongoing expansion of the lens nucleus creates a diffusion barrier that impedes the delivery of essential nutrients and antioxidants from the cortex and epithelium, exacerbating the vulnerability of older lens cells to damage.

Diabetic cataract:

Diabetic cataracts are more prevalent among individuals with diabetes mellitus (DM), a chronic systemic disease that has become increasingly common. Diabetes affects all ocular structures, with cataracts being the most frequent ocular complication and a leading cause of blindness worldwide. The incidence of cataract formation is notably higher in the diabetic population due to several factors, primarily involving the polyol pathway and oxidative stress. In the polyol pathway, hyperosmotic effects arise from the increased intracellular accumulation of sorbitol, leading to the degeneration of hydropic lens fibers and cataract formation. Diabetic patients produce sorbitol more rapidly than it can be converted to fructose by the enzyme sorbitol dehydrogenase. Due to the polar nature of sorbitol, it cannot be easily cleared from cells by diffusion, resulting in a hyperosmotic response and fluid influx that disrupts the osmotic balance. This process leads to the liquefaction and collapse of lens fibers, ultimately resulting in lens opacities. Additionally, osmotic stress from significant swelling of cortical lens fibers can lead to endoplasmic reticulum (ER) stress, generating free radicals and causing oxidative damage to lens fibers. Elevated glucose levels in the aqueous humor of diabetic patients contribute to the glycation of lens proteins, forming advanced glycation end products that further damage lens cells. High levels of hydrogen peroxide (H2O2) in the aqueous humor can induce Fenton reactions, producing hydroxyl radicals (OH-) that exacerbate oxidative stress. Free radical nitric oxide (NO•) is also elevated, promoting peroxynitrite formation and contributing to cellular damage due to its oxidizing properties. Diabetic lenses are particularly vulnerable to oxidative stress due to their reduced antioxidant capacity, with decreased activity of key antioxidant enzymes like superoxide dismutase (SOD), which converts superoxide radicals (O2-) into less harmful substances. This increased susceptibility to oxidative damage accelerates cataract development in diabetic patients. [6]

SYMPTOMS AND SIGNS

These symptoms are commonly associated with cataracts, a condition where the lens of the eye becomes cloudy, leading to a decrease in vision. Here's a breakdown of each symptom and how it relates to cataracts:

1. **Clouded, blurred, or dim vision**: As the lens becomes cloudier, it scatters light entering the eye, resulting in blurry or dim vision.
2. **Trouble seeing at night**: Cataracts can cause reduced light transmission, making it harder to see in low-light conditions.

3. **Sensitivity to light and glare:** The clouded lens scatters light more, increasing glare and sensitivity.
4. **Need for brighter for reading and other activities:** Reduced light transmission means more light is needed for tasks that require good vision.
5. **Seeing "halos" around lights:** Scattered light can create the appearance of halos around bright lights.
6. **Frequent changes in eyeglass or contact lens prescription:** As cataracts progress, vision can change, necessitating frequent updates to corrective lenses.
7. **Fading or yellowing of colors:** The lens discoloration can filter colors, making them appear faded or yellowed.

1) **Double vision in one eye:** Distortions caused by the cataract can result in double vision in the affected eye. [7]

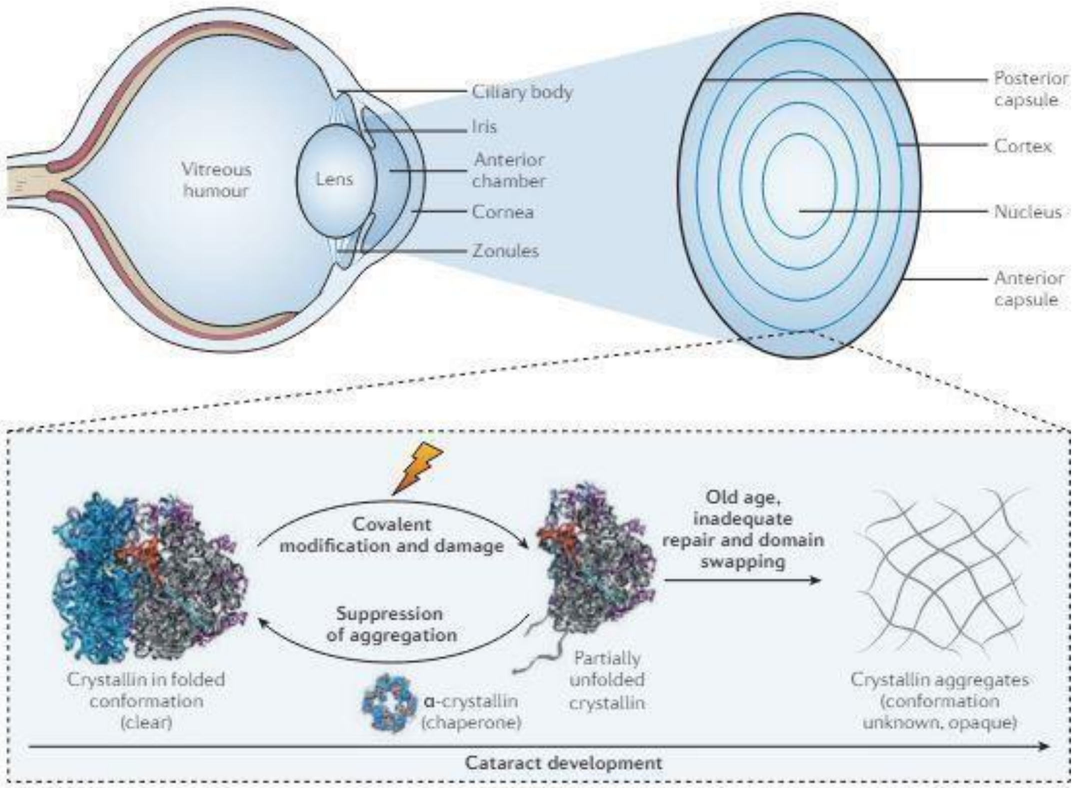

Figure 3: Development of cataract

DIAGNOSIS

Examination:

To determine whether you have a cataract, your eye doctor will thoroughly review your medical history and symptoms and perform a comprehensive eye examination. This process includes several specific tests:

1) Vision Test

Also known as a visual acuity test, this test measures how clearly you can see. During the test, you'll be asked to read a series of letters from an eye chart. Each eye is tested individually while the other is covered. The letters on the chart decrease in size, helping your doctor determine if you have normal vision (20/20) or any visual impairments.

2) Eye Structure Exam

This examination, often called a slit-lamp exam, allows your doctor to take a closer look at the structures at the front of your eye. The slit lamp uses a bright, narrow beam of light to illuminate your eye. The lamp's slit shape allows your doctor to see your eye's components, such as the cornea, iris, lens, and the space between them, in small, detailed sections. This helps in identifying any abnormalities or signs of cataracts.

3) Retinal Exam

A retinal exam focuses on the back part of your eyes, known as the retina. To make the retina easier to examine, your eye doctor will put drops in your eyes to dilate your pupils. This widening of the pupils allows for a better view of the retina. Using either the slit lamp or a specialized device called an ophthalmoscope, your doctor can inspect the lens and retina for any indications of cataracts or other retinal issues.

4) Fluid Pressure Test

Also known as applanation tonometry, this test measures the pressure of the fluid inside your eye, which is important for diagnosing conditions like glaucoma. There are various devices to perform this test, such as a tonometer. The test involves numbing your eyes with drops and then gently applying a small amount of pressure to the eye's surface to measure the intraocular pressure (IOP). High fluid pressure can indicate the presence of glaucoma, which can be associated with cataracts. Each of these tests provides critical information that helps your eye doctor determine whether you have cataracts and the best course of treatment if they are detected. [8]

Diagnosis Tests:

1. Topography

Topography allows for the accurate assessment of corneal curvature using sophisticated technology, enabling the early detection of irregularities before any vision impairment happens.

2. Tonometry

Measuring eye pressure in a painless and non-invasive manner is crucial for glaucoma screening and monitoring, allowing for early detection that facilitates effective treatment and helps preserve vision.

3. Visual Acuity Test

Accurate evaluation of vision through small object measurement enables early detection of eye conditions by observing changes in visual acuity, aiding in treatment planning for cataracts diagnosis based on these results."

4. Refraction Test

Accurate evaluation of refractive errors through objective measurement diagnoses myopia, hyperopia, and astigmatism, and identifies the most suitable corrective lenses for optimal vision.

5. Keratometry

Precise corneal curvature measurement ensures optimal vision correction, facilitates early detection of corneal abnormalities and disorders, and supports personalized treatment plans based on keratometry test results. [9]

MANAGEMENT AND TREATMENT

A cataract is a clouding of the eye’s natural lens, which affects the vision. The general reason for cataracts is aging, but some other factors such as diabetes, trauma, prolonged use of corticosteroids, or expositor to radiation can lead to the condition of cataracts.

There are some Non-surgical Management for cataracts like some lifestyle adjustments which include using brighter lights at home or work, using magnifying glasses for reading and other close-up tasks, and using anti- glare sunglasses, also updating the eyeglasses prescription can improve vision in the early stages of cataracts.

There are no medications that cure cataracts, but managing other conditions like diabetes can help slow their progression

Surgical treatment Some indications for surgery include significant vision impairment which affects daily activities. Some difficulty with night driving, reading, or watching television. Other eye conditions, such as diabetic retinopathy or macular degeneration, require a clear view of the retina for monitoring and treatment.

Types of cataract treatment:

Phacoemulsification is the most common method, where an ultrasonic device breaks up the cloudy lens, which is suctioned out.

Extracapsular cataract extraction (ECCE) involves removing the clouded lens in one piece. This method is not very common and is used in cases of advanced cataracts.

Intraocular lens (IOL) implants in this surgery, the cloudy lens is replaced with a clear artificial lens. There are several types of IOLs firstly Monofocal IOLs it provide clear vision at one distance, usually distance vision.

Multifocal IOLs provide clear vision at multiple distances like near, intermediate, and far Toric IOLs used in correct astigmatism

Several other surgical treatments for cataracts are Femtosecond Laser-Assisted cataract surgery (FLACS), Microincision Cataract Surgery (MICS), 3D Visualization and digital guidance system, Robotic-assisted surgery, etc.

These advancements collectively contribute to safer, more effective cataract surgeries with improved visual outcomes and faster patient recovery times.

Postoperative care after the surgery of a cataract is necessary several measures should be taken after the cataract surgery like regular follow-up visits and checkups are necessary to monitor healing and ensure the IOL is correctly positioned. Applying regular eye drops and medications some antibiotic and anti-inflammatory eye drops are prescribed to prevent infection and reduce inflammation. I am avoiding strenuous activities, heavy lifting, and bending over for a few weeks after surgery to allow proper healing and wearing protective eyewear or an eye shield, especially during sleep, to protect the eye.

Long-term management like Regular Eye Exams Annual or bi-annual eye exams to monitor the health of both eyes and ensure the IOL remains in place. Management of Other Eye Conditions Regular monitoring and treatment of other eye conditions, such as glaucoma or macular degeneration, which may affect overall vision

Cataract surgery is generally safe, but potential complications include posterior capsule opacification (PCO), infection (endophthalmitis), retinal detachment, intraocular lens (IOL) dislocation, increased intraocular pressure (glaucoma), macular edema, corneal edema, astigmatism, dry eyes, and posterior vitreous detachment (PVD). PCO is the most common issue, causing vision to become cloudy again, while infection and retinal detachment, though rare, are serious and require prompt treatment. Other complications like IOL dislocation, increased eye pressure, and macular or corneal edema might need additional treatment or surgery. Regular follow-up is crucial to detect and manage these complications effectively. [10]

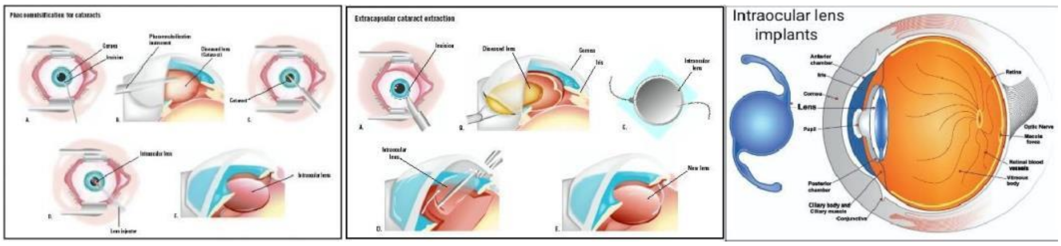

Figure 4: Management and Treatment

PREVENTION

Preventing cataracts involves several key strategies, including regular eye examinations to detect early signs and monitor progression. Protecting the eyes from UV light by wearing sunglasses and hats, alongside maintaining a diet rich in antioxidants (such as vitamins C and E) and omega-3 fatty acids, can significantly reduce risk. It's essential to avoid smoking, as it increases cataract formation, and manage health conditions like diabetes, which elevate risk. Limiting alcohol intake, protecting the eyes from injury, and maintaining a healthy weight through a balanced diet and exercise are also crucial. Additionally, controlling blood sugar levels and avoiding prolonged use of corticosteroids can help prevent cataracts, contributing to overall eye health.

Regular eye check-ups play a crucial role in cataract prevention and management. These exams allow for the early detection of cataracts before symptoms become noticeable, enabling timely intervention. Early detection can help monitor the progression of cataracts and guide decisions regarding lifestyle changes or treatments that may slow their development. Regular check-ups also help identify other eye conditions and health issues contributing to cataract formation, such as diabetes and hypertension. Additionally, eye care professionals can provide personalized advice on protecting eye health, further reducing the risk of cataracts. [11]

CURRENT RESEARCH

Recent advancements in cataract research focus on improving surgical techniques, integrating advanced technology, and developing innovative treatments. Here are the key areas of progress:

Femtosecond Laser-Assisted Surgery:

Technology: The femtosecond laser is used to make precise incisions and break up the cloudy lens, which reduces surgical time and enhances recovery. This laser technology also decreases the risk of postoperative complications, such as corneal swelling and posterior capsule opacification (PCO) (Eye Surgery Guide).

Precision: Utilizing real-time optical coherence tomography (OCT), these lasers provide three-dimensional images, allowing surgeons to tailor surgical plans to each patient's anatomy, resulting in more accurate and effective procedures

Artificial Intelligence (AI): Surgical Assistance: AI technologies in cataract surgery improve preoperative planning by predicting the best surgical approach and intraoperative complications. AI-powered phacoemulsification machines enhance precision during surgery and reduce the risk of complications like corneal abrasions.

Postoperative Analysis: AI helps assess surgical outcomes, enabling continuous improvement in techniques and patient care. It also allows for remote surgeries, which can be vital in areas with limited access to specialized eye care (Eye Surgery Guide).

Advanced Intraocular Lenses (IOLs): Multifocal and Extended Depth of Focus (EDoF) Lenses: These lenses provide better vision across various distances, reducing or eliminating the need for glasses post-surgery. Newer versions like the Light Adjustable Lens (LAL) can be fine-tuned postoperatively to optimize vision for individual patients (Eye Surgery Guide) (Mayo Clinic News Network)

Astigmatism Correction: Some advanced IOLs are designed to correct astigmatism, improving overall vision quality and reducing dependency on glasses (Eye Surgery Guide)

Clinical Trials and Research Innovative Treatments: Various clinical trials are underway to test new treatments and technologies. Notable examples include studies on Dextenza and dexamethasone, which aim to improve postoperative outcomes by reducing inflammation and pain (American Academy of Ophthalmology) .

Leading Institutions: Several hospitals and research centers, such as the Cleveland Eye Clinic and Virginia Eye Consultants, are at the forefront of cataract research, conducting numerous clinical trials to develop and refine new surgical techniques and treatments (ClinicalTrials.gov).

These advancements demonstrate significant progress in cataract treatment, focusing on personalized care, improved surgical outcomes, and enhanced patient quality of life. For more detailed information, refer to sources from the American Academy of Ophthalmology and Mayo Clinic. [12]

SOCIOECONOMIC IMPACT

While there are a few studies that show the prevalence of blindness and ocular morbidity in children, research on the socioeconomic factors related to childhood cataracts is scarce. This study aimed to examine the socioeconomic status, education and occupation of parents, consanguinity, and gender inequality among children presenting with cataracts.

Methods: This hospital-based, prospective, descriptive study included 68 children with cataracts (aged 0–18 years). In addition to clinical parameters and surgical management data, we collected information on age, gender, age at which the chief complaint was noticed, consanguinity of parents, socioeconomic class, and parents' occupation and education. All statistical analyses were performed using MedCalc statistical software (MedCalc Software 2019, Ostend, Belgium).

Result: Among the 68 children with pediatric cataracts, 36 had bilateral cataracts. Thirty children (44%) were aged 1–5 years. Of the 36 bilateral cases, 25 (69.44%) were males and 11 (30.56%) were females. Thirty children (44.1%) presented late. Additionally, 31% belonged to the middle class, and 28% to the lower middle class. Furthermore, 65% of the mothers had an undergraduate education. There is gender-based inequality and delayed presentation of childhood cataracts. To improve early detection, red reflex screening should be mandatory. Further studies are needed to identify barriers to eye care access for girls, in order to plan interventions to improve treatment uptake. The lower socioeconomic status of the patients should be considered in the management of this disease. [13]

CONCLUSION

The outcome of a drawn-out and fascinating procedure is the success of contemporary cataract surgery. Very few other medical procedures have profited from surgical procedure improvements as significantly. As well as implantable technology. Few other medical procedures have improved the lives of so many patients as cataract surgery due to its enormous prevalence. Surgery is now possible at progressively earlier stages of cataract development thanks to improvements in safety, prognosis, and results. However, as the population ages, practically all societies will face greater financial burdens in providing cataract therapy. In the developing world, where cataracts cause more than half of all blindness, the main task at hand is controlling and reducing cataract blindness. The refractive advantages of IOL implantation have made cataract surgery more common in the developed world. One of the most popular refractive procedures in ophthalmology is surgery. As IOL technology progresses, more and more patients may decide to cover the cost of surgery in advance of experiencing a cataract that significantly impairs their vision. This lessens the overall financial burden of cataracts on society and helps many patients become glasses-free.

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