A PROSPECTIVE STUDY OF DRY EYE AFTER CATARACT SURGERY

By

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LIST OF ABBREVIATIONS

Abbreviation	Full Form
MSICS	Manual Small Incision Cataract Surgery
TBUT	Tear Film Break-Up Time
SD	Standard Deviation
NEI	National Eye Institute
OD	Right Eye
OS	Left Eye
DED	Dry Eye Disease
IOP	Intraocular Pressure
OSD	Ocular Surface Disease
PKE	Phacoemulsification
ICCE	Intra-capsular cataract extraction
MGD	Meibomian gland dysfunction
ECCE	Extracapsular cataract extraction
ICCE	Intracapsular cataract extraction
IOL	Intraocular lens
FLACS	Femtosecond laser-assisted cataract surgery
EDOF	Extended Depth of Focus
PCO	Posterior capsular opacification
Nd:YAG	Neodymium-Doped ytrrium Aluminum Garnet
NSAIDs	Non-steroidal anti-inflammatory drugs
WHO	World health organisation
TFOS	Tear Film and Ocular Surface Society's
DEWS II	Dry eye workshop II
ADDE	Aqueous-deficient dry eye
EDE	Evaporative dry eye
IL-1β	Interleukin 1 beta
IL-6	Interleukin 6
TNF-α	Tumor Necrosis factor alpha
BAK	Benzalkonium chloride

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ABSTRACT

Background:

Dry Eye Disease (DED) is a common yet often underrecognized complication following cataract surgery, impacting patient comfort and visual outcomes. With advancing age, altered ocular surface physiology, and variable surgical and postoperative practices, the risk of DED becomes more pronounced.

Objectives:

To evaluate the incidence, severity, and risk factors associated with Dry Eye Disease in patients undergoing cataract surgery, and to compare its occurrence across different age groups, genders, surgical techniques, comorbidities (particularly diabetes), and types of postoperative medications.

Methods:

A prospective observational study was conducted on 340 patients undergoing cataract surgery. Patients were assessed preoperatively and followed up at 1 week and 4 weeks postoperatively. Schirmer's test, Tear Break-Up Time (TBUT), and corneal staining scores were recorded. The type of surgery (phacoemulsification vs. SICS), postoperative eye drops (preservative-containing vs. preservative-free steroids), and presence of diabetes were also analyzed in relation to DED incidence.

Results:

The highest incidence of DED was observed at 1 week postoperatively (57.3%), which declined to 41.8% at 4 weeks. A statistically significant decrease in mean Schirmer's values (14.2 ± 3.5 mm pre-op to 9.8 ± 2.9 mm at 1 week) and TBUT (11.5 ± 2.8 sec to 7.3 ± 2.1 sec) was noted ($p<0.001$). Females (54.4%) and patients aged 56–65 years (41.2%) had a higher prevalence. SICS had a higher incidence of DED (60.5% at 1 week) compared to phacoemulsification (54.8%). Use of preservative-containing steroids was associated with higher DED incidence (67.6% vs. 32.4%). Diabetic patients had significantly higher risk (66.7%) compared to non-diabetics (35.7%).

Conclusion:

Cataract surgery leads to a transient but clinically significant incidence of Dry Eye Disease, especially in older individuals, females, diabetic patients, and those undergoing SICS or

receiving preservative-containing eye drops. Preoperative screening and postoperative management strategies targeting these risk groups are essential to reduce DED burden and improve postoperative comfort and outcomes.

INTRODUCTION

Cataract surgery is one of the most frequently performed and highly successful surgical procedures worldwide, with an efficacy rate of over 90% in restoring vision and significantly enhancing the quality of life in individuals with cataract-induced visual impairment. As global life expectancy continues to increase, the prevalence of cataracts is expected to rise, making cataract surgery a cornerstone in modern ophthalmic practice [1]. However, while cataract surgery effectively addresses the primary pathology, postoperative complications, particularly Dry Eye Disease (DED), remain a significant challenge in clinical practice, often leading to patient dissatisfaction despite satisfactory visual outcomes.

Dry Eye Disease is a complex, multifactorial disorder of the ocular surface characterized by the loss of tear film homeostasis, inflammation, and damage to the ocular surface. In the context of cataract surgery, DED frequently manifests as a postoperative complication due to factors such as tear film instability, surgical trauma, inflammatory responses, and meibomian gland dysfunction (MGD). Studies have reported a high prevalence of postoperative DED, with estimates ranging between 20% and 60%, depending on population characteristics, surgical techniques, and diagnostic criteria [2]. This condition, often referred to as iatrogenic dry eye, not only impairs patient comfort but also affects postoperative visual quality.

The pathophysiology of postoperative DED involves multiple mechanisms. Surgical trauma to the corneal nerves is a significant contributor, leading to reduced corneal sensitivity and disruption of the reflex arc essential for tear production. Additionally, surgery-induced inflammation results in the release of pro-inflammatory cytokines, which destabilize the tear film and exacerbate ocular surface damage. The use of intraoperative and postoperative medications, particularly those containing preservatives, further alters the composition and stability of the tear film [3]. Moreover,

MGD, is a common underlying cause of evaporative dry eye, and worsen following cataract surgery due to mechanical and chemical factors [4].

Patients with postoperative DED often experience symptoms such as **o**cular discomfort**,** burning sensation**,** foreign body sensation**,** and blurred vision. These symptoms, which may persist for weeks to months, have a profound impact on patient satisfaction and overall quality of life despite successful surgical outcomes [5.] Additionally, dry eye symptoms can compromise the accuracy of intraocular lens power calculations, ultimately influencing refractive outcomes.

The diagnosis of postoperative DED is challenging due to its multifactorial nature and variable clinical presentation. Diagnostic modalities include Tear Break-Up Time (TBUT)**,** Schirmer test**,** corneal fluorescein staining**,** and patient-reported outcomes measured using tools such as the Ocular Surface Disease Index (OSDI)**.** Advances in diagnostic techniques, such as meibography and tear osmolarity assessments**,** have further improved the ability to identify and monitor DED in the postoperative setting [6].

Management of postoperative DED focuses on preventive and therapeutic strategies. Preventive measures, including preoperative screening for dry eye and optimization of tear film stability, play a crucial role in reducing the incidence of postoperative DED. Therapeutic approaches include the use of lubricating agents**,** anti-inflammatory medications such as cyclosporine A and corticosteroids, and interventions targeting MGD, such as thermal pulsation devices. Emerging therapies, including lipid-based artificial tears and nerve growth factor eye drops, are currently under investigation for their potential to enhance ocular surface healing and restore tear film homeostasis [7].

Despite significant advancements in surgical techniques and perioperative care, postoperative DED remains an under-recognized and under-treated complication of cataract surgery. This prospective study which aims to evaluate the incidence, risk factors, and severity of DED in patients undergoing

cataract surgery. By systematically analyzing changes in tear film parameters and associated symptoms, this research seeks to provide critical insights into the pathogenesis, diagnosis, and management of postoperative DED.

The findings of this study hold substantial clinical importance, as they address a prevalent but frequently underestimated aspect of cataract surgery. The insights gained will enhance our understanding of postoperative DED, guide the development of evidence-based management strategies, and improve patient outcomes. Furthermore, the study's outcomes may inform the development of novel therapeutic approaches, advancing the standard of care in ophthalmology and ensuring better patient satisfaction and quality of life.

AIM AND OBJECTIVES

1. To assess the progression of dry eye after phacoemulsification (PKE) and manual small incision cataract surgery (SICS).

2. To examine the outcome in terms of causative factors

REVIEW OF LITERATURE

I. History and Evolution of Cataract Surgery

Cataract surgery has been performed for centuries, evolving from crude techniques to the highly precise procedures practiced today. The first documented cataract removal method, couching**,** involved displacing the opaque lens into the vitreous cavity. This technique, practiced as early as 800 BCE in ancient India and China, had limited success and high complication rates [9].The field advanced significantly in the 18th century when Jacques Daviel introduced extracapsular cataract extraction (ECCE)**,** which involved removing the lens while leaving the posterior capsule intact, thus reducing the risk of vitreous prolapse [18].

The 20th century marked the modernization of cataract surgery**,** particularly with the development of intra-capsular cataract extraction (ICCE)**.** Although ICCE involved removing the entire lens and capsule, it often resulted in complications such as retinal detachment and corneal decompensation. The invention of the intraocular lens (IOL) by Harold Ridley in 1949 revolutionized the field by restoring refractive capability post-surgery, significantly improving outcomes [8]. The introduction of phacoemulsification by Charles Kelman in 1967 further transformed the procedure, enabling minimally invasive surgery with rapid recovery times.

In the last two decades, the advent of femtosecond laser-assisted cataract surgery (FLACS) has introduced a new level of precision and reproducibility, addressing limitations of manual techniques and improving safety profiles [10].

Advancements in Surgical Techniques

Phacoemulsification remains the gold standard for cataract removal, offering a minimally invasive approach that utilizes ultrasonic energy to emulsify and aspirate the lens through a small incision. Compared to earlier techniques, phacoemulsification minimizes trauma to the eye, reduces incision size, and accelerates recovery. Modern phacoemulsification devices employ torsional ultrasound technology**,** which enhances efficiency and reduces the risk of corneal endothelial damage [11]. Additionally, advancements in viscoelastic agents have improved surgical outcomes by protecting the corneal endothelium during surgery [3].

Femtosecond Laser-Assisted Cataract Surgery (FLACS) represents a significant technological leap. By employing femtosecond lasers, FLACS automates critical steps such as capsulorhexis, lens fragmentation, and corneal incisions, improving accuracy and reproducibility. Studies indicate that FLACS reduces energy requirements during phacoemulsification and preserves corneal endothelial health, especially in complex cases [20]. However, the higher cost of FLACS remains a limiting factor in its widespread adoption.

The development of advanced intraocular lenses (IOLs) has also transformed cataract surgery. Multifocal IOLs and Extended Depth of Focus (EDOF) IOLs offer superior refractive outcomes, providing patients with enhanced distance, intermediate, and near vision. These lenses significantly reduce dependence on spectacles, thereby improving postoperative quality of life [14] .Additionally, newer IOL materials and designs, such as aspheric and toric IOLs, address higher-order aberrations and astigmatism, further enhancing visual outcomes.

Postoperative Complications and Outcomes

Although cataract surgery has a high success rate, complications—both short- and long-term—can occur. Which are discussed below:

Posterior Capsular Opacification (PCO):

PCO, often referred to as "secondary cataract," occurs due to the proliferation of residual lens epithelial cells on the posterior capsule. Advances in IOL design, particularly the use of hydrophobic acrylic lenses, have significantly reduced PCO incidence [21] Nd:YAG laser capsulotomy remains the standard treatment for PCO.

Endophthalmitis:

Although rare (<0.1%), endophthalmitis is a severe intraocular infection that can result in vision loss. Intracameral antibiotics, such as cefuroxime or moxifloxacin, have been shown to reduce the risk of postoperative endophthalmitis significantly [13].

Cystoid Macular Edema (CME):

CME, characterized by fluid accumulation in the macula, affects 1-2% of cases. It is particularly common in patients with predisposing conditions such as diabetes or uveitis. Preventive measures include the use of non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids [52].

Dry Eye Disease (DED):

DED is a frequent postoperative issue caused by corneal nerve damage, tear film instability, and inflammation. Studies suggest that DED affects up to 60% of patients within the first month post-surgery 12. Preventive strategies, such as preoperative screening and the use of preservative-free artificial tears, have shown promise in reducing symptoms [6].

Other Complications: include corneal edema**,** posterior capsular rupture, and retinal detachment**.** Advances in surgical instruments and techniques have minimized these risks.

Visual and Refractive Outcomes

Cataract surgery consistently achieves excellent visual outcomes, with over 95% of patients achieving a postoperative visual acuity of 20/40 or better (WHO, 2023). Recent innovations, including enhanced diagnostic tools for IOL power calculation (e.g., swept-source optical coherence tomography), have further improved refractive accuracy. Moreover, the use of advanced IOLs, such as trifocal and toric lenses, has significantly enhanced patient satisfaction by reducing the need for corrective eyewear [31].

Future Perspectives

The future of cataract surgery lies in the integration of emerging technologies. Artificial intelligence (AI)-assisted surgical planning, combined with advanced intraoperative imaging systems, is expected to improve precision and efficiency. Additionally, research on next-generation IOLs, including light-adjustable lenses (LALs) and accommodative lenses, offers the potential for greater customization and better refractive outcomes. Personalized medicine, incorporating patient-specific factors into surgical planning, will likely define the next era of cataract surgery [16].

II. Dry Eye Disease (DED): An Overview

Definition and Classification of Dry Eye Disease

Dry Eye Disease (DED) is a multifactorial disorder characterized by a loss of tear film homeostasis**,** leading to ocular surface inflammation and damage. The condition is associated with symptoms of ocular discomfort**,** visual disturbance**,** and tear film instability. The Tear Film and Ocular Surface Society's (TFOS) DEWS II report categorizes DED into two primary subtypes: aqueous-deficient dry eye (ADDE) and evaporative dry eye (EDE)**,** often coexisting in clinical presentations (Jones et

al., 2023). ADDE arises from reduced tear secretion due to lacrimal gland dysfunction, while EDE results from excessive evaporation of tears, frequently linked to meibomian gland dysfunction (MGD)

Pathophysiology of DED: Tear Film Homeostasis, Inflammation, and Ocular Surface Damage

The pathophysiology of DED revolves around the disruption of tear film homeostasis, which includes the lipid, aqueous, and mucin layers. Tear film instability leads to hyperosmolarity**,** triggering an inflammatory cascade that damages the ocular surface.

Tear Film Instability and Hyperosmolarity:

Tear film instability exacerbates evaporation and increases tear osmolarity, which activates pro-inflammatory pathways involving cytokines such as IL-1β, IL-6, and TNF-α**.** This perpetuates ocular surface inflammation and epithelial damage.

Meibomian Gland Dysfunction (MGD):

MGD contributes to EDE by impairing the lipid layer of the tear film. This results in increased evaporation and worsened ocular discomfort.

Neurogenic Inflammation and Corneal Nerve Damage:

DED can alter corneal nerve morphology, reducing sensitivity and affecting the reflex arc necessary for tear production.

Ocular Surface Damage:

Chronic inflammation leads to the loss of goblet cells, contributing to a deficient mucin layer and subsequent epithelial damage, creating a vicious cycle of tear film instability and inflammation

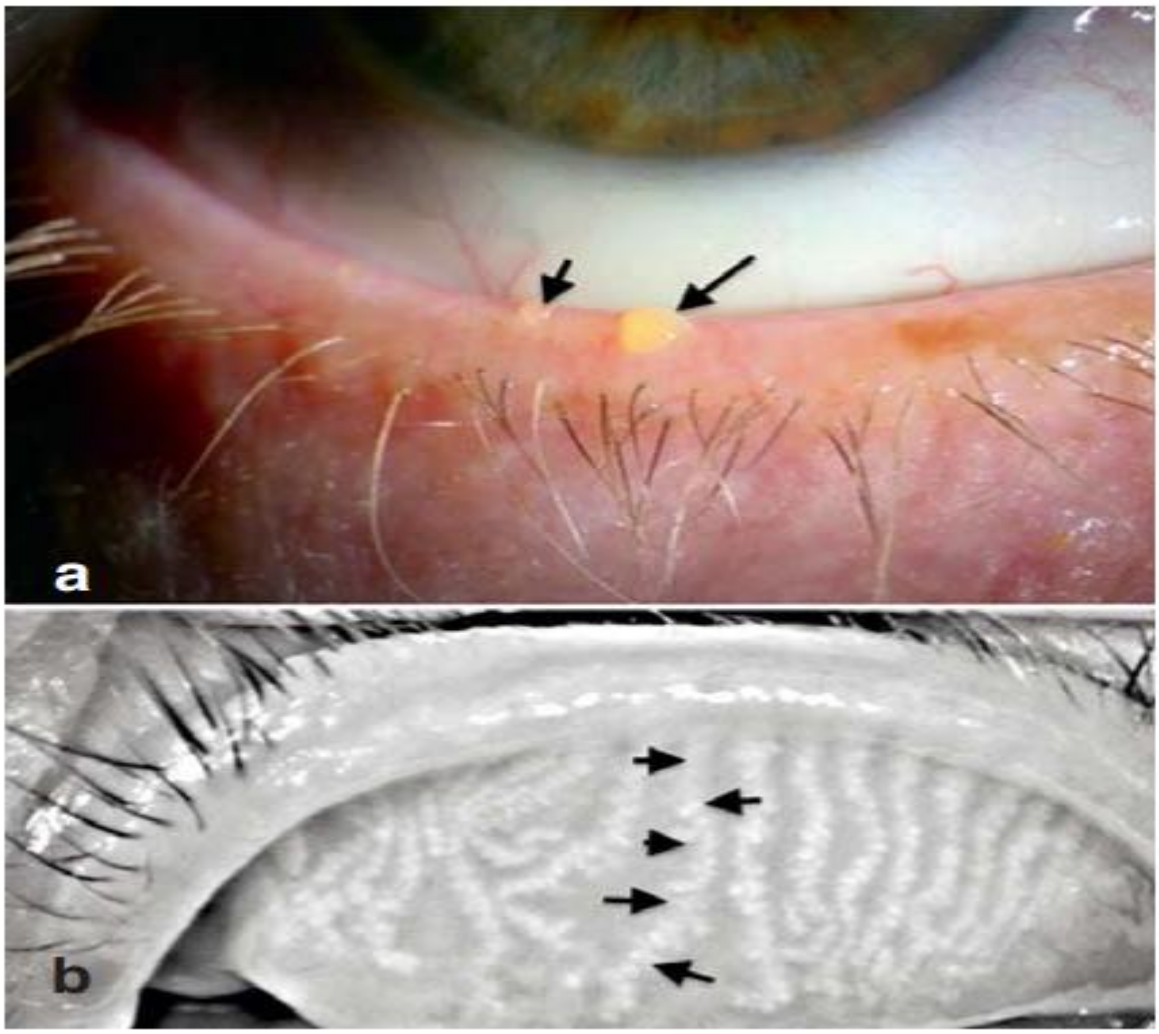


Figure 1: Meibomian gland dysfunction

Tear Film Anatomy and Its Role In Ocular Surface Homeostasis

Introduction to Tear Film

The tear film is a highly specialized, multi-layered structure that plays a pivotal role in ocular surface physiology. It ensures corneal transparency, provides lubrication, and maintains homeostasis by regulating hydration, pH balance, and antimicrobial defense mechanisms. The tear film undergoes dynamic renewal through reflexive blinking, which facilitates even distribution and minimizes tear film breakup time (TBUT). Furthermore, it serves as the first refractive surface of the eye, contributing significantly to optical quality and visual function.

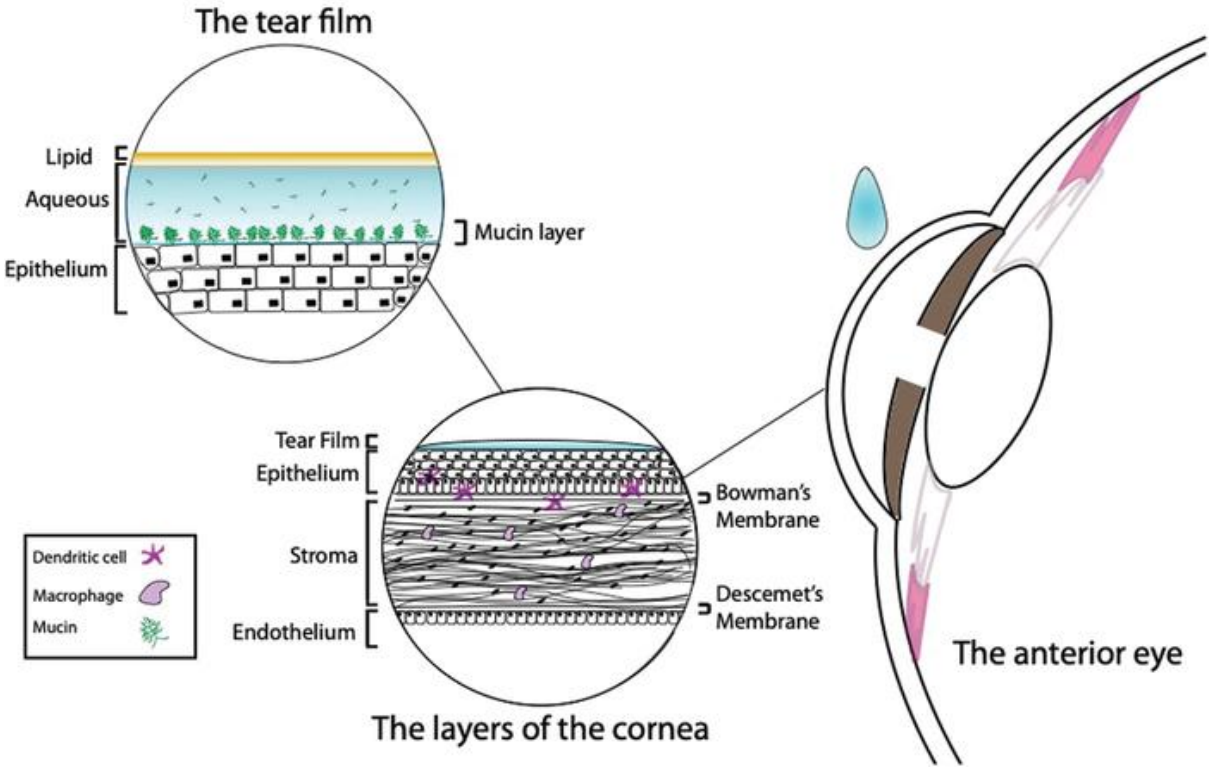


Figure.2 The structure of the cornea and the tear film.

Structural Composition of the Tear Film

The tear film consists of three distinct yet interdependent layers, each contributing uniquely to ocular surface maintenance:

Lipid Layer (Superficial Layer)

Secreted predominantly by the Meibomian glands, with minor contributions from the Zeis and Moll glands.

Composed of polar and non-polar lipids that function to retard evaporation, enhance surface tension, and stabilize tear film dynamics.

Dysregulation of lipid secretion, as seen in Meibomian gland dysfunction (MGD), leads to increased tear film evaporation and destabilization.

Aqueous Layer (Intermediate Layer)

Constitutes the bulk of the tear film, produced by the lacrimal gland and accessory lacrimal glands (Krause and Wolfring glands).

Composed of electrolytes, water, and proteins (e.g., lysozyme, lactoferrin, immunoglobulins) with antimicrobial and anti-inflammatory properties.

Essential for hydration, immune defense, and nutrient transport to the avascular cornea.

Mucin Layer (Innermost Layer)

Secreted by conjunctival goblet cells, epithelial cells, and lacrimal glands.

Contains high molecular weight mucins (e.g., MUC5AC) that convert the hydrophobic corneal surface into a hydrophilic substrate, ensuring tear film adhesion and uniform distribution.

Goblet cell dysfunction, as observed in ocular surface disorders and post-surgical states, disrupts mucin expression, leading to epithelial desiccation and inflammatory sequelae.

Functional Overview of Tear Film Layers

	Physiological Role	**Primary Secretory Source**
Lipid	Minimizes evaporation, stabilizes tear film	Meibomian glands, Zeis glands
Aqueous	Hydration, antimicrobial activity, nutrient supply	Lacrimal gland, accessory glands
Mucin	Facilitates tear adherence, epithelial protection	Goblet cells, epithelial cells

Pathophysiological Alterations in Tear Film Post-Cataract Surgery

Cataract surgery, particularly phacoemulsification, induces iatrogenic disruption of tear film homeostasis through multiple mechanisms:

Corneal Nerve Transection: Surgical incisions, particularly clear corneal incisions, sever sub-basal corneal nerve plexuses**,** leading to reduced corneal sensitivity, impaired lacrimal reflex arcs, and compromised tear secretion**.**

Surgically Induced Inflammation: The release of pro-inflammatory cytokines (IL-1β, TNF-α, IL-6) exacerbates ocular surface inflammation, contributing to tear film instability and goblet cell loss**.**

Meibomian Gland Dysfunction (MGD) Aggravation: Mechanical manipulation and post-surgical topical medication usage (particularly preserved corticosteroids and antibiotics) disrupt meibomian gland secretion, thereby enhancing evaporative dry eye pathology**.**

Alterations in Tear Osmolarity: Postoperative tear hyperosmolarity leads to corneal epithelial cell apoptosis, exacerbating ocular discomfort and visual fluctuations.

Classification of Dry Eye Disease (DED) Based On Tear Film Dysfunction

Dry Eye Disease (DED) is a multifaceted disorder characterized by a loss of tear film homeostasis, increased tear osmolarity, and inflammation-induced ocular surface damage**.** According to the TFOS DEWS II (2017) Report, DED is classified into two primary subtypes:

Aqueous-Deficient Dry Eye (ADDE)

ADDE is predominantly attributed to insufficient aqueous tear secretion secondary to lacrimal gland dysfunction**.**

- Etiological Factors:
    - Autoimmune disorders (e.g., Sjögren's syndrome, rheumatoid arthritis)
    - Age-related lacrimal gland atrophy
    - Systemic pharmacological agents (e.g., antihistamines, beta-blockers, isotretinoin)
    - Lacrimal gland damage due to radiation therapy or chronic inflammation

Evaporative Dry Eye (EDE)

EDE results from excessive tear film evaporation, primarily driven by Meibomian gland dysfunction (MGD) or environmental stressors**.**

- Etiological Factors:
    - Meibomian gland obstruction or altered lipid secretion
    - Reduced blink rate from prolonged digital screen exposure
    - Contact lens wear and ocular surface desiccation
    - Low-humidity environments, pollution, and chronic exposure to air-conditioning

Graphical Representation of Dry Eye Disease Classification

(Figure 2: TFOS DEWS II classification of Dry Eye Disease)

Comparison of ADDE and EDE Pathophysiology

DED Subtype	Pathogenic Mechanism	Prevalent Risk Factors
Aqueous Deficient	Impaired lacrimal gland function	Autoimmune diseases, aging, medications
Evaporative	Excessive tear evaporation	Meibomian gland dysfunction, digital strain, low humidity

Mixed Mechanism Dry Eye (MMDE)

- Many patients exhibit a combination of ADDE and EDE, necessitating an integrative management approach**.**
- Example: A patient with primary Sjögren's syndrome (ADDE) who also has concurrent MGD (EDE) will require both aqueous replacement therapy and lipid-based interventions**.**

Clinical Relevance of DED Classification in Postoperative Cataract Surgery

- Pre-existing ADDE or EDE increases the risk **of** postoperative Dry Eye Syndrome (DES)**,** influencing patient recovery and visual outcomes.
- Preoperative screening for DED facilitates tailored treatment strategies, improving tear film stability and reducing postoperative complications**.**

- Recognizing DED subtypes guides pharmacologic intervention, ensuring rational use of lubricants, anti-inflammatory agents, and lipid-enhancing formulations**.**

Epidemiology and Global Burden of DED

DED affects approximately 5–50% of the global population, with higher prevalence in older adults and females due to hormonal changes [21]. The economic burden of DED is substantial, including direct healthcare costs for diagnosis and management and indirect costs from reduced productivity. In the United States alone, the annual economic impact is estimated to exceed $55 billion.Risk factors include age**,** female gender**,** environmental conditions**,** systemic diseases such as diabetes, and the use of medications like antihistamines and beta-blockers [33].

Dry Eye Disease Post Cataract Surgery

Prevalence and Incidence of Postoperative DED

Postoperative DED is a common complication following cataract surgery, with an incidence ranging from 20% to 60% (Yu et al., 2022). The prevalence depends on factors such as surgical technique, patient demographics, and pre-existing ocular conditions. Studies have shown that symptoms of DED often peak within the first month after surgery and may persist for several months .[50.]

Risk Factors Influencing Postoperative Dry Eye

The development of postoperative DED is influenced by a combination of pre-existing conditions**,** surgical factors, and postoperative medications**.**

Pre-Existing Dry Eye Conditions

Patients with undiagnosed or poorly managed dry eye before cataract surgery are at higher risk of developing postoperative DED. Meibomian Gland Dysfunction (MGD)**,** one of the leading causes of evaporative dry eye, is often exacerbated by the surgical procedure.

Preoperative screening using tests such as Tear Break-Up Time (TBUT), Schirmer test, and meibography is crucial for identifying at-risk individuals.

Surgical Factors

- Type of Incision:

The location and size of surgical incisions can affect corneal sensitivity and tear film stability. Clear corneal incisions, commonly used in phacoemulsification, are associated with corneal nerve damage, reducing reflex tear production [10].

- Surgical Duration:

Prolonged surgical procedures increase exposure time, leading to tear film evaporation and ocular surface desiccation. Studies indicate that surgeries lasting over 30 minutes significantly raise the risk of postoperative DED [25].

- Use of Femtosecond Laser-Assisted Cataract Surgery (FLACS):

FLACS may reduce the risk of dry eye compared to conventional techniques by minimizing mechanical stress on the ocular surface, although this remains a subject of ongoing research[32].

Postoperative Medication Use

Preservatives in Eye Drops: The frequent use of postoperative medications, particularly those containing preservatives such as benzalkonium chloride (BAK), exacerbates ocular surface inflammation and tear film instability. Preservative-free alternatives are recommended to mitigate this risk [9].

Anti-Inflammatory Agents: Corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used postoperatively to reduce inflammation. However, their overuse may impair the healing of the ocular surface and contribute to dry eye symptoms

DED, both as a primary condition and a postoperative complication, poses significant challenges in ophthalmology. Understanding its pathophysiology**,** epidemiology, and risk factors is crucial for developing effective management strategies. Preoperative screening, tailored surgical approaches, and judicious use of preservative-free medications are essential to minimizing the incidence of postoperative DED and improving patient outcomes.

Pathophysiology Of Postoperative Dry Eye

Postoperative dry eye disease (DED) represents a multifaceted and prevalent complication following cataract surgery. Its development is underpinned by an intricate interplay of mechanisms that disrupt ocular surface homeostasis, leading to tear film instability, inflammation, and ocular surface damage. Understanding the pathophysiology of postoperative DED requires a detailed exploration of key processes, including corneal nerve damage, surgical trauma, tear film instability, meibomian gland dysfunction (MGD), and oxidative stress.

Corneal Nerve Damage and Reduced Reflex Tear Secretion

i. Corneal nerves are vital for maintaining the ocular surface's structural and functional integrity. They regulate reflex tear secretion, blinking, and epithelial cell proliferation. During cataract surgery, corneal incisions and prolonged light exposure contribute to mechanical and thermal damage to the corneal sub-basal nerve plexus. This damage leads to reduced corneal sensitivity and subsequent impairments in reflex tearing.

ii. Mechanisms of Nerve Damage:

The clear corneal incisions employed in phacoemulsification sever the corneal nerves, disrupting the neural reflex arc necessary for lacrimal gland activation. The resulting neurotrophic keratopathy diminishes tear secretion and contributes to tear film instability. Furthermore, the ultrasonic energy used in phacoemulsification exacerbates thermal injury to the nerves, prolonging their recovery period [3].

iii. Clinical Implications of Nerve Damage:

Corneal sensitivity, which can be measured using esthesiometry, is often reduced by up to 40% within the first month post-surgery, with partial recovery occurring over the following 6–12 months. This prolonged period of nerve dysfunction correlates with the persistence of dry eye symptoms such as foreign body sensation, stinging, and photophobia [11].

iv. Management and Recovery:

Emerging therapies aimed at enhancing nerve regeneration include the use of nerve growth factor (NGF) eye drops and regenerative therapies such as autologous serum tears. Studies show that these treatments can accelerate corneal nerve regeneration, reducing the severity and duration of postoperative DED [5].

Role of Surgical Trauma and Ocular Inflammation

Cataract surgery induces varying degrees of ocular surface trauma, triggering an inflammatory response that plays a central role in the pathogenesis of postoperative DED. The trauma arises from multiple factors, including the surgical incision, irrigation fluids, and the implantation of the intraocular lens (IOL).

i) Inflammatory Mediators and Ocular Surface Damage**:**

Surgical trauma activates resident immune cells in the ocular surface, leading to the release of pro-inflammatory cytokines such as IL-1β**,** TNF-α**,** and IL-6**.** These cytokines disrupt epithelial barrier function and activate matrix metalloproteinases (MMPs), further degrading the extracellular matrix and epithelial tight junctions [4]. The result is ocular surface desiccation and an exacerbation of dry eye symptoms.

ii) Chronic Inflammation and Goblet Cell Loss:

The inflammatory environment also affects goblet cell density, leading to a deficient mucin layer in the tear film. Goblet cells are essential for tear film stability, and their loss contributes to persistent tear instability and epithelial damage [20].

iii) Impact of Surgical Technique on Inflammation**:**

The degree of ocular surface trauma varies depending on the surgical technique. Femtosecond laser-assisted cataract surgery (FLACS), for example, has been shown to reduce inflammation compared to traditional phacoemulsification. This is attributed to the reduced mechanical manipulation of ocular tissues in FLACS, which minimizes cytokine release and subsequent inflammatory responses [26].

iv) Management Strategies:

The use of anti-inflammatory medications, including corticosteroids and cyclosporine A, has been shown to mitigate inflammation and protect the ocular surface. These medications reduce cytokine production and stabilize the tear film, leading to symptomatic improvement [24].

Tear Film Instability and Meibomian Gland Dysfunction (MGD)

i) Tear film instability is a hallmark of postoperative DED and is often exacerbated by MGD. The tear film consists of a lipid layer**,** aqueous layer**,** and mucin layer**,** each contributing to tear stability and ocular surface protection. Cataract surgery disrupts this delicate balance, leading to increased evaporation and tear film hyperosmolarity.

ii) Meibomian Gland Dysfunction in Postoperative DED:

MGD is a leading cause of evaporative dry eye and is often aggravated after cataract surgery. The prolonged use of intraoperative and postoperative medications, including preservatives, can obstruct the meibomian gland orifices and impair lipid secretion. This results in an unstable lipid layer, increased evaporation, and tear film hyperosmolarity [27].

iii) Clinical Manifestations and Diagnostic Advances:

Postoperative MGD presents as increased tear evaporation, reduced Tear Break-Up Time (TBUT)**,** and symptoms of irritation and dryness. Advanced imaging techniques, such as meibography**,** provide detailed assessments of gland structure and function, enabling early diagnosis and targeted management[19].

iv) Management of MGD-Related Tear Film Instability:

Effective management includes:

Preoperative optimization of the meibomian glands using warm compresses and lid hygiene.

Lipid-based artificial tears to restore the lipid layer.

Thermal pulsation devices, such as LipiFlow, which improve gland function by clearing obstructions and enhancing lipid secretion.

Oxidative Stress and Its Implications for Ocular Surface Health

Oxidative stress, induced by reactive oxygen species (ROS), plays a significant role in postoperative DED by directly damaging the ocular surface and exacerbating inflammation.

i) Sources of Oxidative Stress in Cataract Surgery:

During cataract surgery, prolonged exposure to surgical light and irrigation fluids generates ROS, which overwhelm the ocular surface's antioxidant defenses. ROS disrupt cellular homeostasis, leading to apoptosis of corneal epithelial cells and goblet cells [21].

ii) Impact on Tear Film and Ocular Surface:

Oxidative stress amplifies inflammation by activating nuclear factor-kappa B (NF-κB) signaling pathways. This results in the upregulation of pro-inflammatory cytokines and further destabilizes the tear film. Additionally, oxidative damage to the lipid layer exacerbates tear film evaporation and hyperosmolarity [26].

a. Protective Strategies Against Oxidative Stress**:**

To mitigate oxidative damage, strategies include:

b. Antioxidant therapies, such as eye drops containing vitamin C, E, and coenzyme Q10, which neutralize ROS and enhance epithelial recovery.
c. Optimizing surgical techniques to reduce light exposure and minimize irrigation fluid contact time.

d. The pathophysiology of postoperative DED is driven by a combination of corneal nerve damage**,** surgical trauma**,** tear film instability**,** meibomian gland dysfunction**,** and oxidative stress**.** Each mechanism contributes to a cascade of events that disrupt tear film homeostasis, leading to chronic inflammation and ocular surface damage. A thorough understanding of these mechanisms is essential for developing targeted preventive and therapeutic strategies to mitigate postoperative DED and improve patient outcomes.

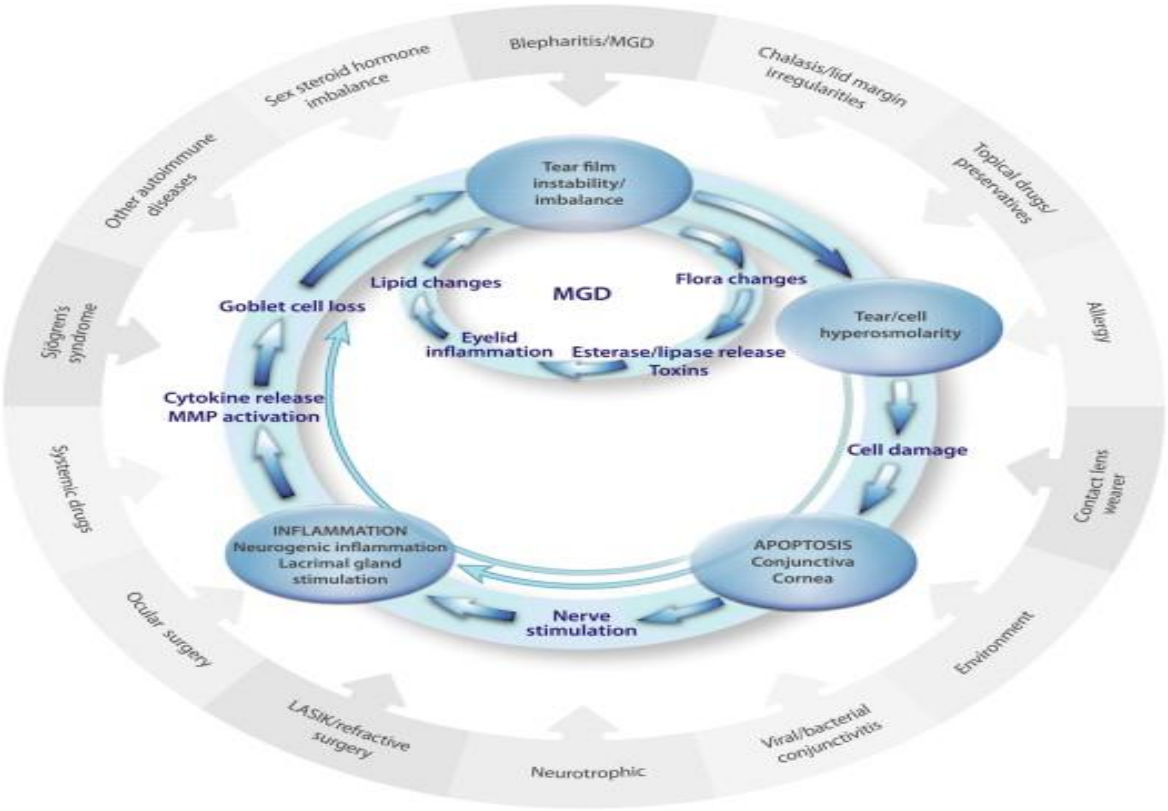


Figure 3: Proposed schema of the vicious circle theory for DED pathology, adapted from Baudouin.15 MMP: matrix metalloproteinase. LPS: lipopolysaccharide. MGD: meibomian gland dysfunction.

Clinical Manifestations of Postoperative Dry Eye Disease (DED)

Postoperative dry eye disease (DED) is a common complication following cataract surgery, characterized by a constellation of symptoms that significantly impact the patient's quality of life

and visual outcomes. While the condition is often transient, it can persist for months, particularly in patients with predisposing factors or pre-existing ocular surface disease.

Symptoms: Foreign Body Sensation, Burning, and Blurred Vision

Postoperative DED manifests with a spectrum of symptoms that vary in severity and onset:

Foreign Body Sensation**:**

- Patients often report a gritty or sandy feeling, attributed to disrupted tear film integrity and exposure of corneal nerve endings. This sensation arises from tear film instability and subsequent friction between the eyelids and the ocular surface [15].

Burning and Irritation**:**

- Inflammatory mediators released after surgery, including cytokines like IL-1β and TNF-α, contribute to ocular surface hypersensitivity and discomfort. This symptom is exacerbated by tear hyperosmolarity, which irritates the ocular surface [26].

Blurred Vision**:**

- Tear film instability disrupts the refractive properties of the tear film, leading to visual fluctuations. This is especially pronounced in patients with pre-existing dry eye or meibomian gland dysfunction (MGD) [24].

Impact on Patient Quality of Life and Satisfaction

The symptoms of postoperative DED significantly diminish patients' quality of life, particularly because cataract surgery is often performed with the expectation of restoring vision and improving functional independence.

Emotional and Physical Distress**:**

- Chronic discomfort and visual disturbances reduce patient satisfaction, leading to frustration and anxiety. Studies have reported that up to 40% of patients are dissatisfied with their surgical outcomes due to DED symptoms [27].

Functional Impairment**:**

- DED limits daily activities such as reading, driving, and working, especially under low-light or windy conditions. These limitations are compounded in patients with bilateral surgery, where the cumulative effects of dry eye are more pronounced [25].

Patient-Reported Outcome Measures (PROMs):

- Tools such as the Ocular Surface Disease Index (OSDI) and Standardized Patient Evaluation of Eye Dryness (SPEED) reveal high symptom burden in postoperative DED patients, with significant impairments in both emotional and functional domains.

Influence on Refractive and Visual Outcomes

DED directly influences refractive and visual outcomes following cataract surgery:

Reduced Accuracy in IOL Power Calculations:

- Tear film instability alters keratometric readings used in intraocular lens (IOL) calculations, resulting in refractive surprises. This is particularly problematic for premium IOLs, such as toric and multifocal lenses, which demand precise preoperative measurements [4].

Postoperative Visual Fluctuations:

- The disrupted tear film creates inconsistent refractive surfaces, leading to fluctuating vision and poor contrast sensitivity. These visual disturbances are most noticeable during activities requiring sustained focus, such as driving or using digital devices [6].

Impact on Patient Satisfaction with Premium IOLs:

- Patients receiving multifocal or extended depth-of-focus (EDOF) IOLs are more likely to notice the effects of DED due to the lenses' sensitivity to tear film disruptions. This can result in dissatisfaction despite technically successful surgery [20].

Diagnostic Approaches in Postoperative DED

Accurate diagnosis of postoperative DED involves a combination of subjective assessment tools and objective diagnostic techniques. A comprehensive diagnostic approach is crucial for tailoring effective management strategies.

Subjective Assessment Tools

a) **Ocular Surface Disease Index (OSDI)**:

The OSDI is a validated questionnaire that quantifies the severity of dry eye symptoms and their impact on daily activities. It evaluates **ocular discomfort**, **visual disturbance**, and **environmental triggers**, with a score >13 indicating DED [1].

b) **Standardized Patient Evaluation of Eye Dryness (SPEED)**:

The SPEED questionnaire focuses on symptom frequency and intensity over time, particularly for evaporative dry eye associated with MGD. It is widely used in clinical and research settings for its ease of administration and reproducibility [24].

Objective Diagnostic Techniques

c) Tear Break-Up Time (TBUT):

TBUT measures tear film stability by assessing the time it takes for the tear film to break after a blink. A TBUT of less than 10 seconds is diagnostic of DED. Postoperative TBUT often declines due to disrupted lipid layers and tear evaporation [26].

d) Schirmer Test:

The Schirmer test evaluates aqueous tear production using filter paper strips placed under the lower eyelid. A reading of <10 mm after 5 minutes indicates aqueous-deficient dry eye. This test is particularly relevant in identifying patients with pre-existing lacrimal gland dysfunction [27].

e) Corneal Fluorescein Staining:

Fluorescein dye highlights areas of epithelial damage and tear film instability. The severity of staining correlates with the degree of ocular surface disruption, making it a key tool for assessing postoperative dry eye severity [15].

f) Meibography:

Meibography uses infrared imaging to visualize the structure of the meibomian glands. Gland dropout and atrophy, commonly seen postoperatively, provide objective evidence of MGD contributing to evaporative dry eye (Li et al., 2022) [19].

g) Tear Osmolarity Measurements:

Elevated tear osmolarity is a hallmark of DED, reflecting hyperosmolar stress and inflammation. Modern osmolarity measurement devices, such as the **TearLab Osmolarity System**, enable quick and non-invasive evaluation of tear film health (Zhou et al., 2022) [4].

TABLE 1

Dry eye disease severity grading scheme [1]

Dry eye severity level	1	2	3	4
Discomfort, severity and frequency	Mild and/or episodic; occurs under environmental stress	Moderate episodic or chronic, stress or no stress	Severe frequent or constant without stress	Severe and/or disabling and constant
Visual symptoms	None or episodic mild fatigue	Annoying and/or activity-limiting episodic	Annoying, chronic and/or constant, limiting activity	Constant and/or possibly disabling
Conjunctival injection	None to mild	None to mild	+/−	+/++
Corneal staining (severity/location)	None to mild	Variable	Marked central	N/A
Corneal/tear signs	None to mild	Mild debris, ↓ meniscus	Filamentary keratitis, mucus clumping, ↑ tear debris	Filamentary keratitis, mucus clumping, ↑ tear debris, ulceration
Lid/meibomian glands	MGD variably present	MGD variably present	MGD frequent	Trichiasis, keratinization, symblepharon
Tear film break-up time (seconds)	Variable	≤ 10	≤ 5	Immediate
Schirmer score (measures tear secretion) (mm/5 minutes)	Variable	≤ 10	≤ 5	≤ 2

Figure 3: Dry eye disease severity grading scheme

VII. Risk Factors for Postoperative Dry Eye Disease (DED)

Postoperative DED is influenced by a range of factors that include patient-specific characteristics, surgical variables, and environmental and medication-related issues. Understanding these risk factors is crucial for identifying at-risk individuals and implementing targeted preventive measures.

Patient-Related Factors

1. **Age, Gender, and Systemic Diseases**:
    - **Age**: Older adults are more prone to postoperative DED due to reduced tear production, diminished corneal sensitivity, and structural changes in the meibomian glands. Age-related changes in the ocular surface predispose individuals to tear film instability [27.]
    - **Gender**: Females have a higher risk of developing DED, primarily due to hormonal fluctuations, particularly postmenopause. Estrogen and androgen imbalances affect the lacrimal and meibomian glands, contributing to aqueous-deficient and evaporative dry eye [28].
    - **Systemic Diseases**: Conditions such as diabetes, rheumatoid arthritis, and Sjögren's syndrome increase susceptibility to DED. These diseases alter ocular surface homeostasis through inflammatory pathways and autonomic neuropathy [29].
2. **Pre-existing Dry Eye or Meibomian Gland Dysfunction (MGD)**:
    - Patients with undiagnosed or poorly managed dry eye or MGD are at higher risk for postoperative exacerbation. MGD contributes to evaporative dry eye by impairing the lipid layer of the tear film, leading to increased tear evaporation and Hyperosmolarity [30].

Surgical Factors

1. **Type of Cataract Surgery**:
    - **Manual Cataract Surgery**: Techniques such as extracapsular cataract extraction (ECCE) involve larger incisions and more manipulation, increasing ocular surface trauma and the risk of DED.

- **Laser-Assisted Cataract Surgery (LACS)**: Femtosecond laser-assisted cataract surgery (FLACS) offers improved precision and reduced tissue damage compared to manual techniques. However, the suction used during FLACS can exacerbate ocular surface stress [31].

2. **Duration of Surgery and Type of Incision**:
    - Longer surgical times are associated with greater exposure to light and irrigation fluids, leading to ocular surface desiccation. Clear corneal incisions disrupt corneal nerve plexuses, impairing reflex tearing and exacerbating dry eye symptoms [32].

Environmental and Medication-Related Factors

1. **Environmental Factors**:
    - Operating room conditions, such as low humidity and exposure to surgical light, contribute to tear film evaporation and ocular surface dryness during surgery [33].
2. **Postoperative Medications**:
    - The frequent use of eye drops containing preservatives like benzalkonium chloride (BAK) exacerbates ocular surface inflammation and tear film instability. Long-term use of these medications can induce toxic effects on the corneal epithelium [34].

Preventive Strategies for Postoperative DED

Proactive measures to prevent postoperative DED include preoperative screening, optimization of the ocular surface, and patient education.

Preoperative Screening and Optimization of Tear Film

1. **Screening for Dry Eye and MGD**:

- Preoperative assessment using tools such as the **Tear Break-Up Time (TBUT)**, **Schirmer test**, and **meibography** is critical for identifying patients at risk of DED. Early detection allows for tailored interventions [36]

2. **Optimizing the Ocular Surface**:
    - Patients with pre-existing dry eye or MGD should undergo preoperative optimization, including the use of preservative-free artificial tears, warm compresses, and anti-inflammatory treatments [37]

Use of Preservative-Free Medications

The use of preservative-free artificial tears and postoperative medications minimizes ocular surface toxicity. Preservative-free formulations reduce inflammation and improve tear film stability, particularly in patients requiring long-term therapy .[38]

Patient Education and Compliance with Postoperative Care

Educating patients about the importance of postoperative care, including adherence to prescribed regimens, proper application of eye drops, and lifestyle modifications, improves outcomes. Informing patients about environmental modifications, such as using humidifiers and avoiding excessive screen time, can also mitigate dry eye symptoms [39].

VIII. Management of Postoperative DED

The management of postoperative DED involves a multimodal approach, addressing tear film instability, inflammation, and meibomian gland dysfunction.

Artificial Tears and Lubricating Eye Drops

1. **Artificial Tears**:

- Artificial tears remain the first-line treatment for postoperative DED. They provide immediate relief by replenishing the aqueous layer of the tear film and reducing Hyperosmolarity [40.]

2. **Lipid-Based Artificial Tears**:
    - These are particularly beneficial for evaporative dry eye associated with MGD. Lipid-based formulations restore the tear film's lipid layer, reducing evaporation and improving stability [41]

Anti-Inflammatory Therapies

1. **Corticosteroids**:
    - Short-term use of corticosteroids reduces postoperative inflammation and improves tear film stability. However, prolonged use is limited by the risk of side effects such as increased intraocular pressure [42].
2. **Cyclosporine A and Lifitegrast**:
    - These immunomodulatory agents reduce T-cell-mediated inflammation, addressing the underlying inflammatory component of DED. Cyclosporine A has shown efficacy in improving goblet cell density and tear production [43].

Management of Meibomian Gland Dysfunction

1. **Warm Compresses and Lid Hygiene**:
    - Warm compresses improve lipid secretion from the meibomian glands, while lid hygiene clears obstructed gland orifices, enhancing tear film quality [32].
2. **Thermal Pulsation Devices**:
    - Devices such as LipiFlow apply controlled heat and pressure to the eyelids, effectively clearing gland obstructions. These devices are highly effective for moderate to severe MGD [33].

Emerging Therapies

1. **Nerve Growth Factor Eye Drops**:
    - These drops promote corneal nerve regeneration, improving reflex tearing and reducing symptoms of neurotrophic keratopathy [34.]
2. **Autologous Serum Eye Drops**:
    - Rich in growth factors and cytokines, these drops provide biological support for ocular surface healing and are particularly useful for severe DED [35]
3. **Dietary Supplements (Omega-3 Fatty Acids)**:
    - Omega-3 fatty acids have anti-inflammatory properties that improve meibomian gland function and tear film quality. Studies suggest that supplementation reduces dry eye symptoms and inflammation 36

IX. Impact of Postoperative Dry Eye Disease (DED) on Outcomes

Postoperative dry eye disease (DED) has a profound impact on both the immediate and long-term outcomes of cataract surgery. Despite the high success rates of modern cataract surgery, postoperative DED remains a significant challenge, affecting patient satisfaction, refractive accuracy, visual rehabilitation, and overall ocular health.

Patient Satisfaction and Quality of Life

1. **Reduced Patient Satisfaction**:
    - Cataract surgery is often performed with the expectation of restoring vision and improving quality of life. However, the onset of DED symptoms such as dryness, burning, and blurred vision post-surgery undermines these expectations. Studies reveal that **up to 40% of**

patients report dissatisfaction with their surgical outcomes due to postoperative DED symptoms.

2. **Emotional and Functional Impacts**:
    - Chronic discomfort and visual disturbances negatively affect patients' emotional well-being. Functional impairments in daily activities such as reading, driving, and digital device usage further exacerbate dissatisfaction, particularly in patients with bilateral surgeries 36
3. **Patient-Reported Outcome Measures (PROMs)**:
    - Tools like the **Ocular Surface Disease Index (OSDI)** demonstrate that postoperative DED significantly impacts emotional and functional aspects of patients' lives. Effective management of DED is crucial for improving these scores and overall satisfaction[37].

Impact on Refractive Accuracy and Visual Rehabilitation

1. **Inaccuracies in Preoperative Measurements**:
    - Tear film instability affects corneal topography and keratometry readings, critical for accurate intraocular lens (IOL) power calculations. These inaccuracies result in refractive surprises, particularly in premium IOL recipients such as those using multifocal or toric lenses [38.]
2. **Fluctuations in Vision Post-Surgery**:
    - An unstable tear film disrupts the refractive surface, leading to fluctuations in vision and poor contrast sensitivity. These issues are more pronounced in patients who opt for advanced IOLs, where precise optical clarity is essential for optimal [39.]

3. **Delayed Visual Rehabilitation**:
    - Persistent symptoms of DED can slow the process of visual recovery and adaptation to IOLs, leading to prolonged frustration and dissatisfaction for patients [40]

Long-Term Implications for Ocular Health

1. **Chronic Ocular Surface Inflammation**:
    - Persistent DED symptoms promote chronic inflammation, which can lead to structural changes in the corneal epithelium and meibomian glands. This may predispose patients to conditions such as **neurotrophic keratopathy** .
2. **Risk of Secondary Complications**:
    - Unmanaged postoperative DED increases the risk of complications such as **recurrent epithelial erosions**, **corneal scarring**, and reduced resistance to infections. These conditions may necessitate additional treatments and impact long-term ocular health [41].

Advances in Research on Postoperative DED

Recent Findings on the Molecular Basis of DED

1. **Role of Pro-Inflammatory Cytokines**:
    - Recent studies have identified **IL-1β, IL-6, and TNF-α** as key mediators in the pathogenesis of DED. These cytokines disrupt epithelial barrier function and perpetuate ocular surface inflammation [42]

2. **Tear Film Hyperosmolarity**:
    - Advances in understanding tear film dynamics have highlighted hyperosmolarity as a central driver of DED. Hyperosmolar stress activates pathways such as **MAPK and NF-κB**, leading to increased production of inflammatory mediators and oxidative stress [43]

Innovations in Diagnostic Technologies

1. **Tear Osmolarity Measurement**:
    - Devices like the **TearLab Osmolarity System** allow for rapid and non-invasive quantification of tear osmolarity, providing a reliable diagnostic marker for DED severity [44]
2. **Advanced Imaging Techniques**:
    - **Meibography** and **optical coherence tomography (OCT)** have enabled detailed visualization of meibomian glands and tear film structure, aiding in the early diagnosis and monitoring of DED progression [45.]
3. **Biomarker-Based Diagnostics**:
    - Emerging research focuses on identifying biomarkers such as **MMP-9** and **Lactoferrin** in tear samples, offering insights into the inflammatory and immune status of the ocular surface [46.]

Potential New Therapeutic Approaches Under Investigation

1. **Nerve Growth Factor Eye Drops**:
    - These drops promote corneal nerve regeneration, addressing neurotrophic components of DED and enhancing reflex tear secretion [47.]

2. **Autologous Serum Eye Drops**:
    - Rich in growth factors and cytokines, these drops provide biological support for epithelial healing and are being evaluated for severe cases of postoperative DED [48].
3. **Lipiflow Thermal Pulsation Therapy**:
    - This device applies heat and pressure to the eyelids, improving meibomian gland function and lipid layer quality. Recent trials have demonstrated its efficacy in managing MGD-associated DED [49].

MATERIALS AND METHODS

Study Design

This prospective follow-up study of Dry eye Disease after cataract surgery was conducted for the period of 18 months, from may 2023 to December 2024, at the Department of Ophthalmology, B.L.D.E. (Deemed to be University)'s Shri B.M. Patil Medical College, Hospital and Research Centre, Vijayapura**.** The study included total 340 patients, undergoing phacoemulsification (PKE) and manual small incision cataract surgery (SICS) who fulfilled both inclusion and exclusion criteria.

Method of Collection of Data

Ethical Considerations

- Ethical Approval**:** The study has received ethical clearance from the Institutional Ethics Committee of B.L.D.E. (Deemed to be University).
- BLDE(DU)/IEC/863/2022-23
- **Informed Consent**: Written informed consent was obtained from all participants in their preferred language. The consent form explains the purpose, procedure, risks, and benefits of the study.

Sample Size

The study includes **340 patients**, calculated using the formula:

$$\mathbf{N = [(Z\alpha + Z\beta) / C]^2 + 3}$$

Where:

- $\mathbf{Z\alpha = 1.9600}$, standard normal deviate for 95% confidence.
- $\mathbf{Z\beta = 1.6449}$, standard normal deviate for 95% power.
- $\mathbf{C = 0.5 \times \ln[(1 + r) / (1 - r)]}$, with $\mathbf{r = -0.19411}$ (anticipated correlation).

Inclusion and Exclusion Criteria

1. **Inclusion Criteria**:
    - Patients aged **45 to 75 years** with senile cataracts.
2. **Exclusion Criteria**:
    - Pre-existing dry eye disease or ocular surface disorders.
    - Systemic conditions affecting tear production (e.g., **rheumatoid arthritis**, **ocular hypertension**).
    - Previous ocular surgeries (e.g., refractive surgery, keratoplasty).
    - History of trauma, chemical burns, or extensive contact lens use.

All the patients undergone **comprehensive preoperative screening**, including:

- Detailed medical and ocular history.
- Best-corrected visual acuity (BCVA)
- Comprehensive slit-lamp examination to evaluate ocular surface status, lid margin, tear film, and conjunctival and corneal integrity.
- Intraocular pressure with non-contact tonometry
- Fundus examination with direct and indirect ophthalmoscopy

Preoperative investigations include:

- Random Blood Sugar (RBS)
- Rapid HIV Test
- HbsAg Spot Test**:** Screening for hepatitis B infection.

- Preoperative assessment of dry eye status using:
    - **Schirmer's Test 1 (ST1)**: Evaluates baseline tear production.
    - **Tear Film Break-Up Time (TBUT)**: Assesses tear film stability.

- **Corneal Fluorescein Staining (CFS)**: Detects epithelial damage.

Preoperative Preparation

All patients received mydriasis using Itrop Plus eye drops, comprising tropicamide (0.8%) and phenylephrine hydrochloride (5%) with benzalkonium chloride preservative (0.01%)**,** instilled three times over an hour to achieve adequate pupillary dilation.

Anesthesia Technique

A peribulbar block was administered using a combination of:

- 4 ml Lignocaine (2%) with 1:100000 adrenaline
- 2 ml Bupivacaine (0.75%)
- 150 units Hyaluronidase

This provided satisfactory akinesia and anesthesia for the surgical procedure.

Betadine ophthalmic solution (povidone-iodine 5%) was used as an antiseptic preoperatively.

Surgical Technique

Patient (n=197) underwent Manual Small Incision Cataract Surgery (MSICS) with a 6–7 mm superior partial-thickness incision. A three-planar self-sealing tunnel was made, and the side-port incision was placed at the 9 o'clock position**.**

Patient (n=143) underwent Phacoemulsification with a clear corneal incision, and the side-port incision was placed at the 3 and 9 o'clock position.

At the end of surgery, the side port was hydrated, and subconjunctival injection of Tobramycin(0.1-0.5ml of 2%) and Dexamethasone(0.5-1ml of 0.4%) was administered for both the procedures. The eye was then patched.

Postoperative Medication Protocol

For Patients who underwent SICS

- Topical antibiotics and steroids containing eye drops (Ofloxacin 0.3% + Dexamethasone 0.1% +Benzalkonium chloride 0.01%): Administered hourly for the first week, followed by weekly tapering over 1 month.

For Patients who underwent phacoemulsification

- Topical antibiotics and steroids containing eye drops (Moxifloxacin 0.5% + Dexamethasone 0.1%) preservative free: Administered hourly for the first week, followed by weekly tapering over 1 month**.**

Follow-Up Study

Patients were evaluated at regular intervals post-surgery:

1. First Follow-Up**:** 1 week after surgery.
2. Second Follow-Up**:** 4 weeks after surgery.

During follow-ups, patients were reassessed for:

Changes in tear film parameters through objective tests

- **Schirmer's Test I**

  This test was conducted without anesthesia to assess both basal and reflex tear secretion. A sterile Schirmer's strip made of Whatsman no. 41 filter paper (5 × 35 mm) was folded 5 mm at one end and placed at the junction of the lateral one-third and medial two-thirds of the lower conjunctival fornix**.** The strip remained in place for 5 minutes, and the length of wetting was measured using the printed scale on the strip. Values less than 10 mm indicated dry eye.

Schimer I Test (SIT) Length of moist strip measured after 5 min.	SEVERITY
SIT > 10 mm/min	NORMAL
SIT > 5mm/5min < 10 mm/5min	MILD
SIT >3mm/5min <5mm/5min	MODERATE
SIT <3mm/5min	SEVERE

Tear Film Break-Up Time (TBUT)

This test was used to assess tear film stability. A 1% sterile fluorescein strip was moistened with normal saline and applied to the inferior fornix. The patient was asked to blink several times, and then the time interval between the last blink and the appearance of the first dry spot (seen as a dark area under cobalt blue light on slit lamp) was recorded using a stopwatch. A TBUT less than 10 seconds indicated tear film instability.

Tear film Break – up Time (TBUT) Time deference between the last blink and the presence of the first blank spot on the corneal surface	SEVERITY
TUBT >10sec	NORMAL
TBUT >5 sec TBUT <10 sec	MILD
TBUT >3 sec TBUT <5 sec	MODERATE
TBUT <3sec	SEVERE

- **Corneal fluorescein staining**

Corneal staining was performed to evaluate the integrity of the corneal epithelium and identify any punctate epithelial erosions indicative of ocular surface damage. A 1% sterile fluorescein strip was moistened with sterile saline and gently applied to the inferior fornix of the patient's eye. After several blinks to evenly distribute the dye, the corneal surface was examined under a slit lamp using a cobalt blue filter**.**

The staining pattern was assessed based on the **National Eye Institute (NEI) grading scale**, where the cornea was divided into five zones and each was scored on a 0–3 scale depending on the intensity and extent of staining. A total maximum score of 15 indicated severe epithelial damage. Corneal staining served as an important marker of ocular surface compromise and was

recorded preoperatively for all patients.

Cornea (FLUORESCEIN STAINING)

Grade 0 – 0 Dots ☐

Grade 1- 1-15 Dots ☐

Grade 2- 16-30 Dots ☐

Grade 3- 31 or >31 dots ☐

Statistical Analysis

The collected data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Statistical techniques include:

- **Descriptive Statistics**: Mean, standard deviation (SD), and percentage calculations.
- **Inferential Statistics**:
    - Repeated Measures ANOVA for normally distributed variables.
    - Fisher exact test
    - Chi-Square Test for categorical variables.
    - Correlation Analysis to explore relationships between continuous variables.
- A p-value < 0.05 will be considered statistically significant.

Probable Outcomes

1. Quantification of the incidence and progression of DED after cataract surgery.
2. Identification of causative factors for postoperative DED, enabling targeted interventions.
3. Evaluation of differences in DED outcomes between phacoemulsification and SICS techniques.

OBSERVATIONS AND RESULTS

This section presents the detailed observations and results of the study, analyzing the incidence, severity, and progression of Dry Eye Disease (DED) in patients undergoing cataract surgery. The results are categorized based on demographic characteristics, preoperative and postoperative dry eye parameters, and their statistical significance in relation to risk factors and surgical techniques.

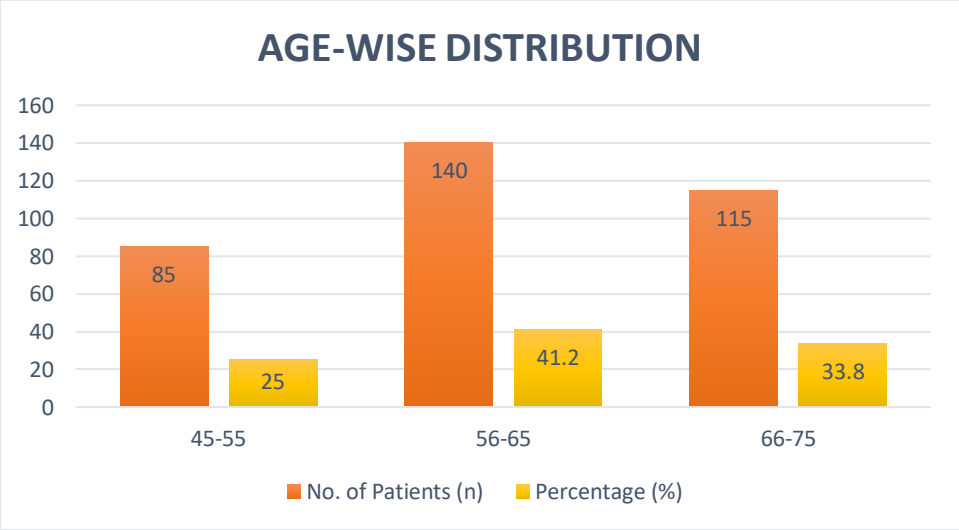
1. Demographic Distribution

A total of 340 patients were included in the study.

Table 1: Age-Wise Distribution of Study Population

Age Group (Years)	No. of Patients (n)	Percentage (%)
45-55	85	25.0
56-65	140	41.2
66-75	115	33.8
Total	**340**	**100**

The majority of patients (41.2%) were in the 56–65 years age group, a range that aligns with the peak incidence of cataracts and higher susceptibility to ocular surface disorders.



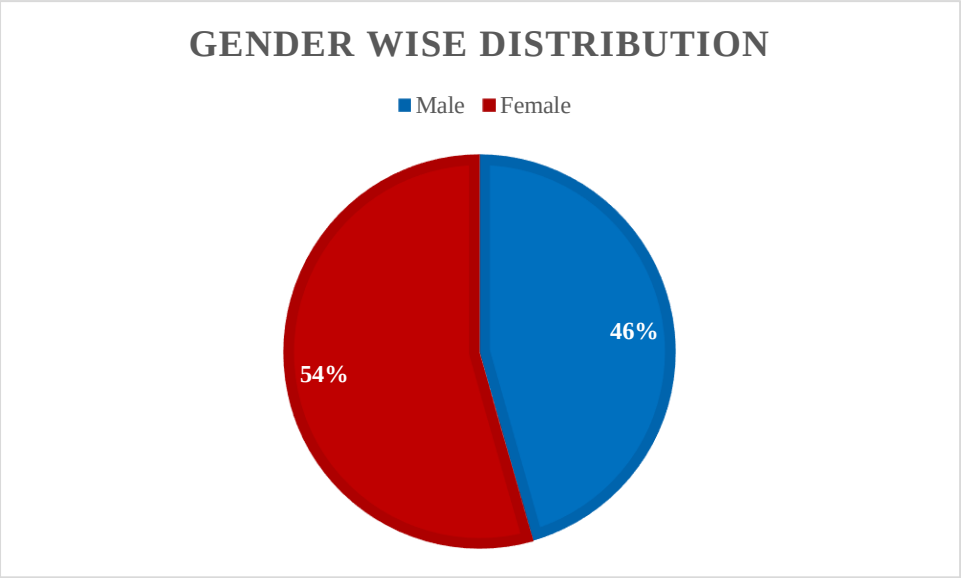
Graph.1 A bar graph representation of age wise distribution

2. Gender Distribution

Table 2: Gender Distribution of Study Population

Gender	No. of Patients (n)	Percentage (%)
Male	155	45.6
Female	185	54.4
Total	340	100

Females constituted a higher proportion (54.4%), which correlates with previous studies reporting an increased prevalence of postoperative dry eye in women due to hormonal influences.



Graph.2 A pie chart representation of gender wise distribution

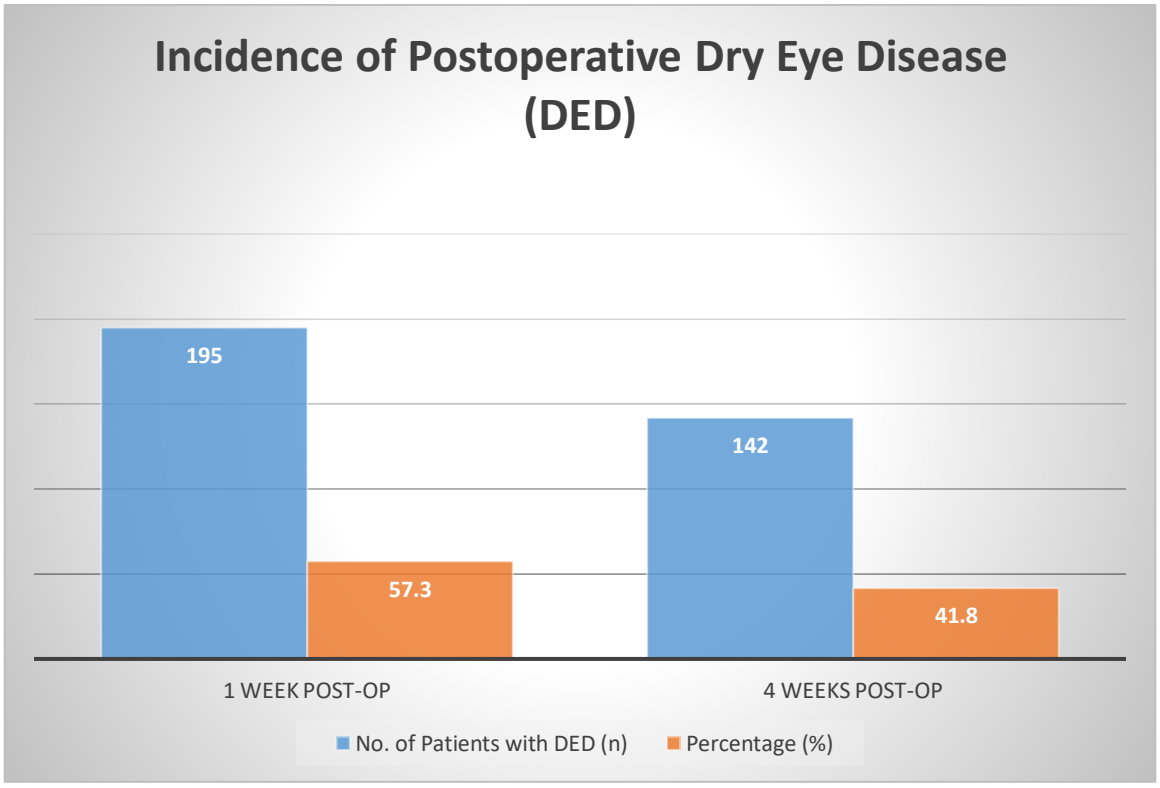
3. Incidence of Postoperative Dry Eye Disease (DED)

Postoperative dry eye symptoms were recorded at 1 week, and 4 weeks postoperatively. The incidence of DED was determined based on Schirmer's Test, Tear Break-Up Time (TBUT), and CFS(Corneal fluorescein staining).

Table 3: Incidence of DED at Different Follow-Up Intervals

Time Point	No. of Patients with DED (n)	Percentage (%)
1 Week Post-op	195	57.3
4 Weeks Post-op	145	41.8
Total	340	100

The incidence of DED peaked at 1 week postoperatively (57.3%), with a decline at 4 weeks (41.8%). These findings align with previous studies indicating transient tear film instability post-surgery due to corneal nerve damage and inflammation.



Graph.3 A bar graph representation of **Incidence of DED at Different Follow-Up Intervals**

4. Comparison of Dry Eye Parameters Pre- and Postoperatively

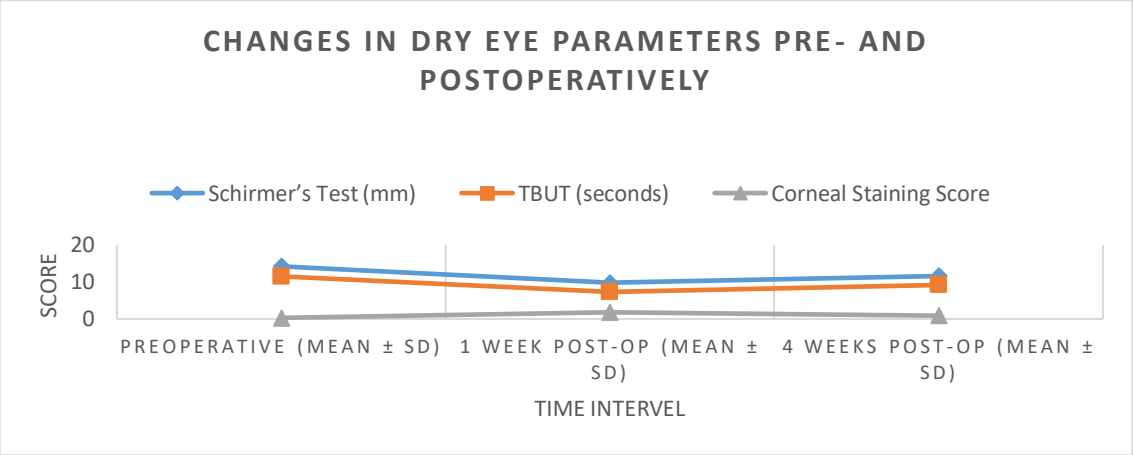
The mean values of Schirmer's Test, TBUT, and corneal staining scores were compared at baseline, 1 week, and 4 weeks postoperatively.

Table 4: Changes in Dry Eye Parameters Pre- and Postoperatively

Parameter	Preoperative (Mean ± SD)	1 Week Post-op (Mean ± SD)	4 Weeks Post-op (Mean ± SD)	p-Value
Schirmer's Test (mm)	14.2 ± 3.5	9.8 ± 2.9	11.6 ± 3.2	<0.001*
TBUT (seconds)	11.5 ± 2.8	7.3 ± 2.1	9.2 ± 2.4	<0.001*
Corneal Staining Score	0.3 ± 0.6	1.8 ± 0.9	0.9 ± 0.7	<0.001*

(*p < 0.05 considered statistically significant)

The significant decline in Schirmer's test values ,TBUT and Corneal staining score postoperatively indicates a decrease in tear production and tear film instability,



Graph.4 A bar graph representation of **Changes in Dry Eye Parameters Pre- and Postoperatively**

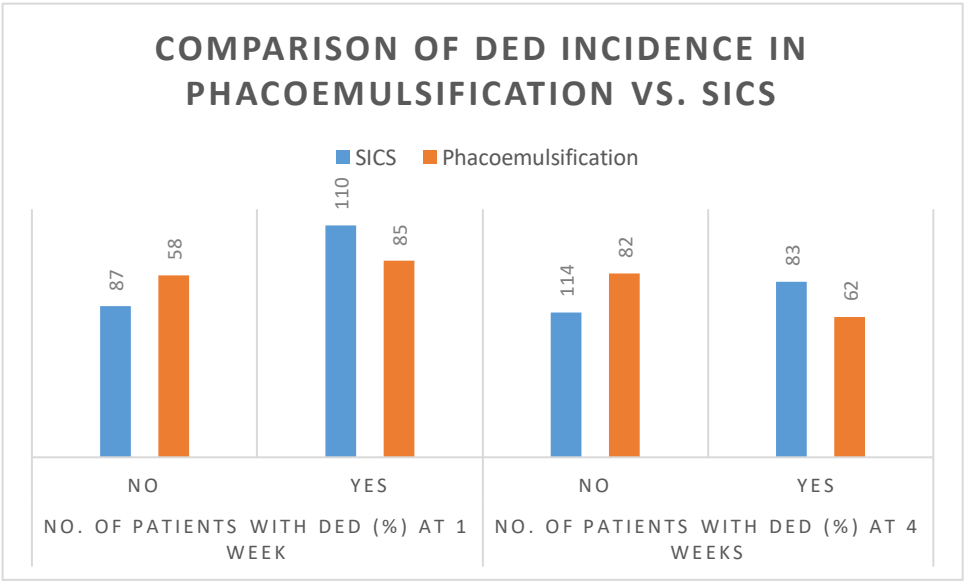
5. **Impact of Surgical Techniques on DED**

A subgroup analysis was performed to compare the impact of phacoemulsification and small incision cataract surgery (SICS) on postoperative dry eye.

Table 5: Comparison of DED Incidence in Phacoemulsification vs. SICS

Surgical technique	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
SICS	87 (39.5%)	110 (60.5%)	114 (45.2%)	83 (54.8%)
Phacoemulsification	58 (48.1%)	85 (51.9%)	82 (56.7%)	62 (43.3%)

DED incidence was higher in SICS patients at both 1-week and 4-week follow-ups.



Graph.5 A bar graph representation of **Comparison of DED Incidence in Phacoemulsification vs. SICS**

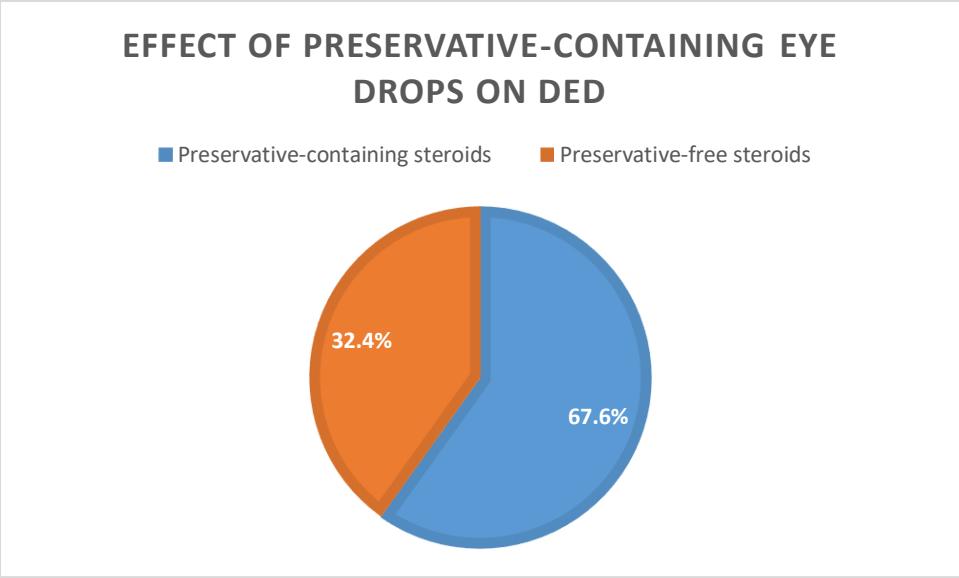
6. **Association Between Postoperative Medication Use and DED**

Postoperative medications were analyzed for their impact on DED incidence.

Table 6: Effect of Preservative-Containing Eye Drops on DED

Medication Type	No. of Patients with DED (%) at 4 Weeks
Preservative-containing steroids	96 (67.6%)
Preservative-free steroids	46 (32.4%)

Patients using preservative-containing steroids had a significantly higher incidence of DED (67.6%) compared to those on preservative-free formulations (32.4%), supporting previous findings on benzalkonium chloride toxicity.



Graph.6 A pie chart representation of effect **of Preservative-Containing Eye Drops on DED**

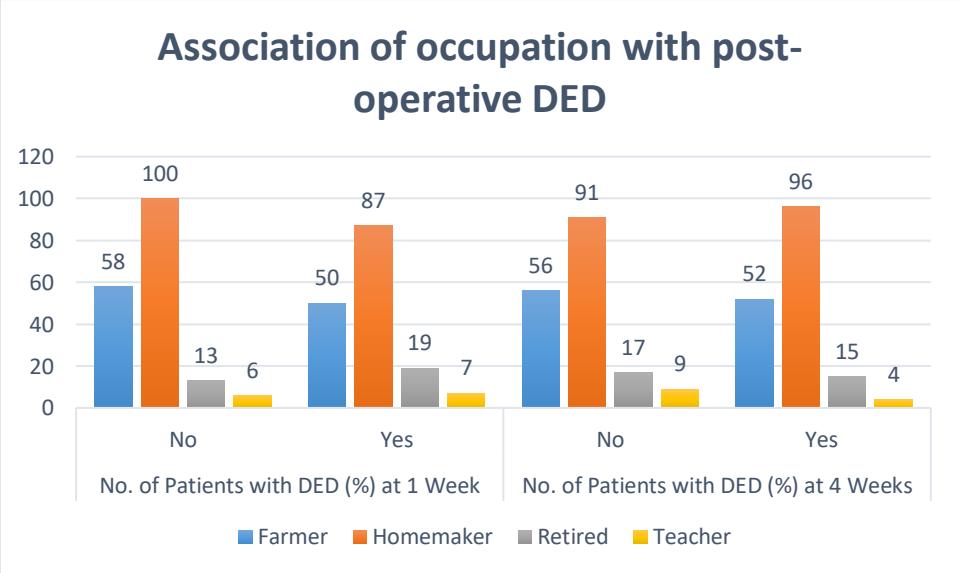
7. Association of occupation with post-operative DED

This table analyses the association between occupation and post-operative incidence of dry eye, using Chi-square test.

Table 7: **Association of occupation with post-operative DED**

Occupation	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
Farmer	58 (32.8%)	50 (30.7%)	56 (32.4%)	52 (31.1%)
Homemaker	100 (56.5%)	87 (53.4%)	91 (52.6%)	96 (57.5%)
Retired	13 (7.3%)	19 (11.7%)	17 (9.8%)	15 (9.0%)
Teacher	6 (3.4%)	7 (4.3%)	9 (5.2%)	4 (2.4%)
p-value	0.547		0.520	

There was a non-significant difference in the incidence of dry eye after 1 week among different professions. Similarly, there was a non-significant difference in the incidence of dry eye after 4 weeks among different professions.



Graph.7 A bar graph representation of **association of occupation with post-operative DED**

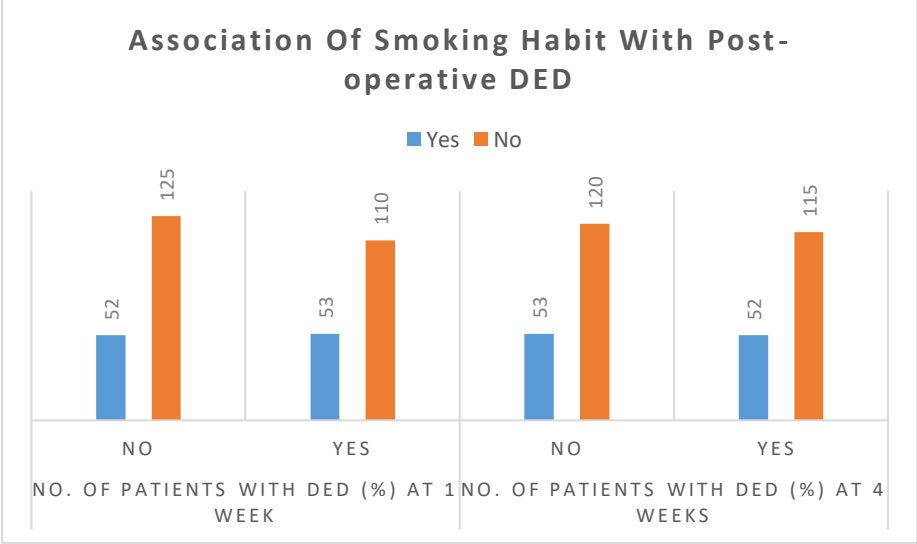
8. **Association of smoking habit with post-operative DED**

A subgroup analysis using Fisher exact test was performed to compare the impact of smoking on postoperative dry eye.

Table 8: **Association of smoking habit with post-operative DED**

Smoking	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
Yes	52 (29.4%)	53 (32.5%)	53 (30.6%)	52 (31.1%)
No	125 (70.6%)	110 (67.5%)	120 (69.4%)	115 (68.9%)
p-value	0.558		1.000	

There was a non-significant difference in the incidence of dry eye after 1 week among smokers & non-smokers. Similarly, there was a non-significant difference in the incidence of dry eye after 4 weeks among smokers & non-smokers.



Graph.8 A bar graph representation of **association of smoking habit with post-operative DED**

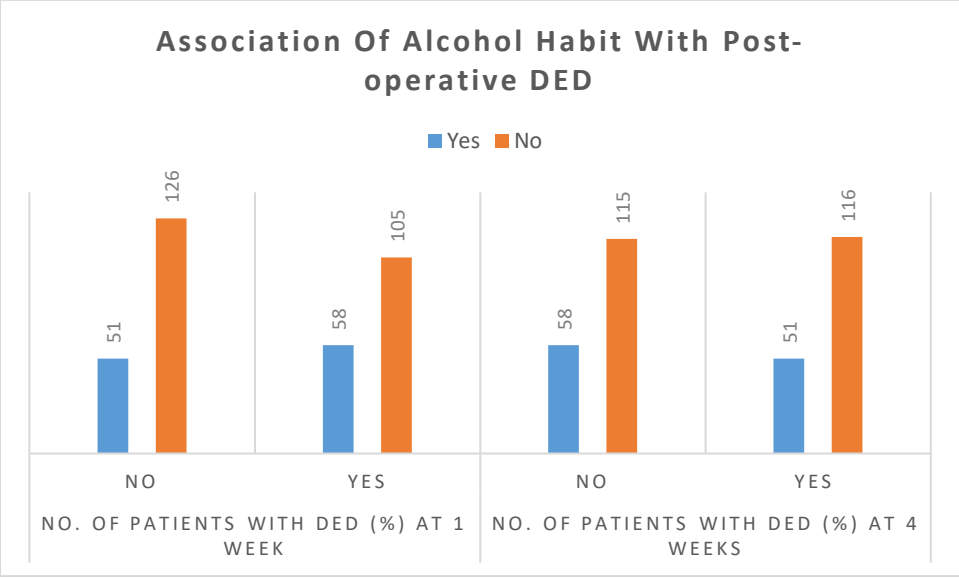
9. Association of alcohol habit with post-operative DED

A subgroup analysis using Fisher exact test was performed to compare the impact of alcohol habit on postoperative dry eye.

Table 9: **Association of alcohol habit with post-operative DED**

Alcohol	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
Yes	51 (28.8%)	58 (35.6%)	58 (33.5%)	51 (30.5%)
No	126 (71.2%)	105 (64.4%)	115 (66.5%)	116 (69.5%)
p-value	0.201		0.564	

There was a non-significant difference in the incidence of dry eye after 1 week among alcoholics & non-alcoholics. Similarly, there was a non-significant difference in the incidence of dry eye after 4 weeks among alcoholics & non-alcoholics.



Graph.9 A bar graph representation of the **association of alcohol habit with post-operative DED**

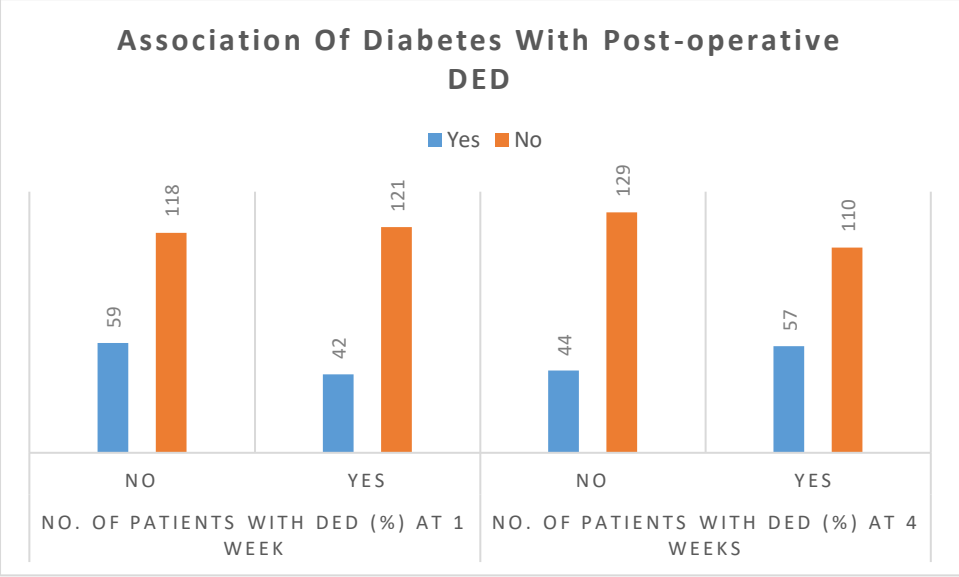
10. **Association of diabetes with post-operative DED**

This table analyses the association between diabetes and post-operative incidence of dry eye using Fisher exact test.

Table 10: **Association of diabetes with post-operative DED**

Diabetes	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
Yes	59 (33.3%)	42 (25.8%)	44 (25.4%)	57 (34.1%)
No	118 (66.7%)	121 (74.2%)	129 (74.6%)	110 (65.9%)
p-value	0.154		0.096	

There was a non-significant difference in the incidence of dry eye after 1 week among diabetics & non-diabetics. Similarly, there was a non-significant difference in the incidence of dry eye after 4 weeks among diabetics & non-diabetics.



Graph.10 A bar graph representation of the **association of diabetes with post-operative DED**

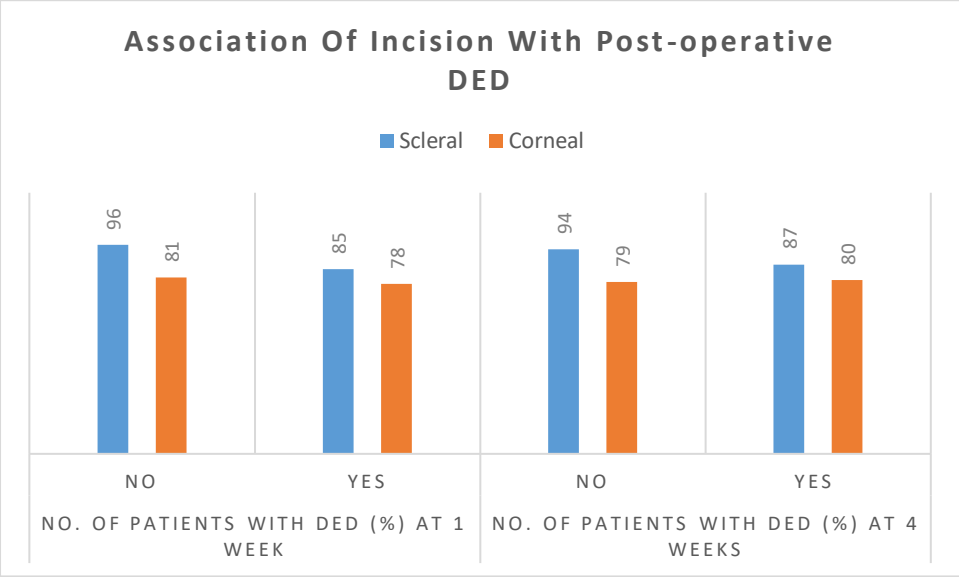
11. **Association of incision with post-operative DED**

An analysis using Fisher exact test was performed to compare the impact of scleral incision and corneal incision on postoperative dry eye.

Table 11: **Association of incision with post-operative DED**

Incision	No. of Patients with DED (%) at 1 Week		No. of Patients with DED (%) at 4 Weeks	
	No	Yes	No	Yes
Scleral	96 (54.2%)	85 (52.1%)	94 (54.3%)	87 (52.1%)
Corneal	81 (45.8%)	78 (47.9%)	79 (45.7%)	80 (47.9%)
p-value	0.745		0.744	

There was a non-significant difference in the incidence of dry eye after 1 week according to the incision. Similarly, there was a non-significant difference in the incidence of dry eye after 4 weeks according to the incision.



Graph.11 A bar graph representation of the **association of incision with post-operative DED**

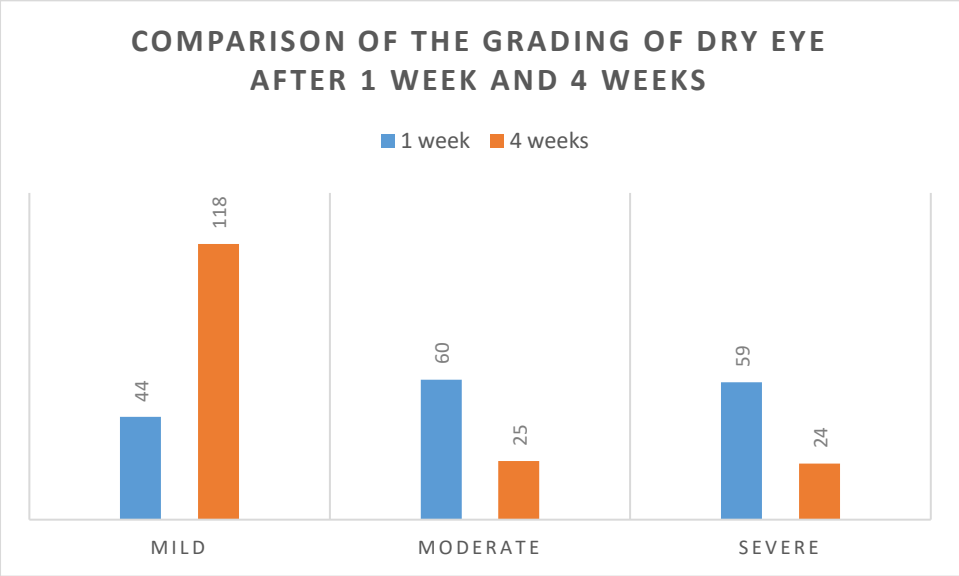
12. **Comparison of the grading of dry eye after 1 week and 4 weeks**

This table compares the grading of DED after 1 week and 4 weeks in terms of mild, moderate and severe using Wilcoxon signed rank test.

Table 12: **Comparison of the grading of dry eye after 1 week and 4 weeks**

Interval	Mild	Moderate	Severe	p-value
1 week	44 (27.00%)	60 (36.80%)	59 (36.20%)	<0.001*
4 weeks	118 (70.70%)	25 (15.00%)	24 (14.40%)	

After 1 week, there were 44 mild cases, whereas there were 118 mild cases after 4 weeks. The number of severe cases reduced from 59 (after 1 week) to 24 (after 4 weeks). This difference in the grading of dry eye after 1 week and 4 weeks was significant.



Graph.12 A bar graph representation of **Comparison of the grading of dry eye after 1 week and 4 weeks**

DISCUSSION

Dry Eye Disease (DED) has increasingly gained clinical significance due to its rising prevalence, particularly in the elderly population undergoing cataract surgery. While cataract surgery is one of the most commonly performed ophthalmic procedures worldwide [1,2,51] Emerging literature emphasizes that even uneventful phacoemulsification or SICS can disturb the ocular surface by altering the corneal innervation, disrupting the tear film, and eliciting an inflammatory response [3,55,66]. These changes are transient for many patients; they can lead to persistent symptoms affecting quality of life and visual satisfaction postoperatively [5,50,53].

It is particularly critical to identify risk factors that increase the susceptibility to postoperative DED. Age, sex, pre-existing systemic comorbidities (notably diabetes mellitus), the choice of surgical technique, and the type of postoperative medications used, all influence the onset and course of DED [2,4,56]. Furthermore, objective parameters like Schirmer's test, TBUT, corneal staining, and subjective measures such as the Ocular Surface Disease Index (OSDI) help quantify these postoperative changes [6,54,57].

The association between DED after cataract surgery and diabetes mellitus was reported by Sajnani et al. The effects of hyperglycemia on the lacrimal gland functional unit components are systematically transmitted via neural connections, resulting in abnormal tear production and composition, both of which contribute to DED. Older age and female sex were associated with DED after cataract surgery. Notably, Kohli et al. showed that individuals above the age of 60 years had worse OSDI, Schirmer test results, TFBUT, CFS, and TMH at 2 weeks post-cataract surgery.[54,55,57]

When discussing about effects of postoperative medications, Kato et al. observed the negative effects of topical non-steroidal anti-inflammatory drugs (NSAIDs) after cataract surgery on conjunctival goblet cell density, raising concerns about DED with prolonged topical NSAID administration. Increased duration of surgery and longer phacoemulsification time may be risk factors for postoperative DED, compounded by increased microscopic light exposure. [54,57,59]

Considering the multifactorial pathophysiology of DED and the wide-ranging effects of cataract surgery on the ocular surface, we conducted this study involving 340 patients undergoing cataract surgery, sought to comprehensively analyze these factors to better understand the demographic and procedural influences on postoperative dry eye. The observations were carefully structured to reflect the temporal progression of symptoms, the role of surgical modalities, the effect of medications,

and systemic vulnerabilities such as diabetes.

In our study, the majority of patients belonged to the 56–65-year age group (41.2%), followed by 33.8% in the 66–75 group. This trend is congruent with findings from Lin et al., who reported similar age-related vulnerability to DED postoperatively [91]. Moss et al. also demonstrated a linear increase in the prevalence of DED with advancing age, with significant spikes beyond the age of 50 [92].

Ageing has been well-documented to impair mucin production, alter tear film stability, and reduce meibomian gland function. This anatomical and physiological vulnerability makes postoperative insult—however minimal—more impactful in this age group. Thus, age is a non-modifiable risk factor and a central consideration in postoperative counselling and prophylactic management.

The gender distribution in our study revealed a higher representation of females (54.4%), echoing multiple studies that consistently report a higher prevalence of dry eye among women. Schaumberg et al. reported that women were 1.7 times more likely to develop DED compared to men, with hormonal fluctuations being a primary contributing factor (56). Estrogen and androgen imbalances, particularly post-menopause, adversely affect meibomian gland function and tear composition [93].

In a study by Zhou et al., the female-to-male ratio of DED incidence post-cataract surgery was nearly 2:1, similar to our observed trend [94]. This highlights the need for sex-specific screening and possibly hormone-related therapeutics in managing postoperative DED

At 1 week post-surgery, 57.3% of patients exhibited clinical features of DED, which dropped to 41.8% by the fourth postoperative week. This trend supports the findings of Xiao et al., who observed that early transient dry eye symptoms post-cataract surgery typically peak within the first 7–10 days, with gradual normalization over 1–3 months [96].

Consistent with our data, Kasetsuwan et al. reported a postoperative dry eye incidence of 61% at 1 week, which declined to 45% by 4 weeks (60,54), reinforcing the transient nature of surgery-induced ocular surface disturbance. The etiology is often linked to intraoperative exposure to microscope light, irrigation fluids, and corneal nerve transection, all contributing to neurotrophic dysfunction and inflammation [95].

A statistically significant reduction in Schirmer's values (14.2 mm pre-op to 9.8 mm at 1 week and 11.6 mm at 4 weeks, $p<0.001$) and TBUT (from 11.5 sec to 7.3 sec and 9.2 sec) was observed in

our cohort. These reductions confirm decreased aqueous production and unstable tear film, hallmarks of postoperative DED.

Kim et al. observed similar results, reporting a mean TBUT drop from 12.4 to 7.1 seconds at 1-week post-phacoemulsification [27]. Likewise, Sahu et al. showed a significant fall in Schirmer's scores from 16.1 to 10.2 mm postoperatively [96]. The corneal staining scores also rose significantly (0.3 to 1.8), reflecting epithelial compromise, corroborated by Lu et al., who observed postoperative staining in 72% of patients. [64]

These parameter shifts suggest that while dry eye signs and symptoms are transient, they are most severe during the initial postoperative week—making this window crucial for therapeutic intervention. In our subgroup analysis, SICS showed a higher incidence of DED at both 1-week (60.5%) and 4-week (54.8%) intervals compared to phacoemulsification (51.9% and 43.3%, respectively). The assumption that phacoemulsification causes more DED due to clear corneal incisions is contradicted here—likely because of longer operative times and larger conjunctival manipulation in SICS.

Garg et al. observed similar findings, with DED incidence post-SICS at 61.4% vs. 44.7% in phacoemulsification cases A study by Pradhan et al. attributed the difference to more sustained inflammation and mechanical trauma in SICS.

These findings suggest that both techniques impair tear film integrity, the postoperative recovery is more rapid and less symptomatic in phacoemulsification—possibly due to faster healing of smaller incisions and lesser inflammation.

Smoking is a well-known risk factor for numerous chronic diseases, including those that damage the eyes. The health of the eyes may be compromised by smoking-related chemicals that reduce blood flow and/or hasten thrombus formation in ocular capillaries.[98,99] Similarly in our study the results shows that there is an association between smoking and DED development but the results were statistically non-significant. So, we cannot confirm, that smoking makes you more likely to have dry eyes in general.

Alcohol consumption has been proven to be significantly related to a variety of diseases, while the association between alcohol and the risk of DED still remains unclear. Chia *et al* argued that drinking may play a protective role in the development of DED[100]; on the contrary, Galor *et* al[98] showed that drinking was related to an increased risk of DED; others held the opinion that DED

may have nothing to do with alcohol consumption.[101] Relating with our data the results where the association between alcohol consumption habit and DED development was statistically nonsignificant.

The prevalence of disease was observed to bear a significant association with the occupation of studied subjects. The maximum prevalence of DED was in household workers. Elderly females had a history of exposure to smoke and dust while cooking food on chulha. Findings similar to our study were seen in a study by Lee et al[102] results where, homemakers (35%) and farmers (27.5%) comprised the most dominant occupational groups. We feel that considering differences in sanitary conditions and environment, place of residence and occupation could have a role in affecting the dry eye prevalence.[103,104]

Kasetsuwan et al.[105] conducted their study that followed up patients at days 0, 7, 30 and 90, and reported that the severity of dry eye peaked at postoperative 7 days. Similarly, most previous studies also reported a predominance of mild dry eye (53.32% by Venugopal[106] and 58.06% by Manjula et al.[107]). This was corealted with results of our study where severe dry eye was more at 1 week (36.80%) and mild in fourth week (70.70%). However, Jayashree et al.[108] reported a predominance of severe dry eye which contradicted our study.

CONCLUSION

The study establishes that Dry Eye Disease (DED) is a common postoperative complication of cataract surgery, with peak incidence occurring at one week postoperatively (57.3%) and partial recovery observed at four weeks (41.8%). The significant decline in Schirmer's test values (from 14.2 ± 3.5 mm preoperatively to 9.8 ± 2.9 mm at one week) and TBUT (from 11.5 ± 2.8 seconds to 7.3 ± 2.1 seconds) highlights transient tear film instability and corneal nerve disruption as key pathophysiological mechanisms. Demographic factors played a crucial role, with 61.2% of cases occurring in the 56–65 years age group and a higher prevalence in females (54.4%), suggesting the impact of aging and hormonal variations on tear film homeostasis. Surgical techniques also influenced DED severity, with SICS patients experiencing higher incidence (60.5% at one week, 54.8% at four weeks) compared to phacoemulsification patients (51.9% and 43.3%,) respectively. Additionally, postoperative medications significantly contributed to DED severity, with preservative-containing steroids increasing incidence to 67.6%, compared to 32.4% in preservative-free formulations, reinforcing the need for safer pharmacological choices.

Lastly, there was association of Diabetes, smoking and alcoholism with DED but the values were statistically insignificant. The findings from our study emphasize the necessity of preoperative dry eye screening, selection of optimal surgical techniques, and the use of preservative-free medications to minimize DED risk. There was a difference in the incidence of dry eye after 1 week among different professions that is farmers and homemakers were more susceptible, but statistically the difference was non-significant.

Future research should focus on long-term DED progression beyond four weeks and evaluate emerging therapies for improved postoperative tear film stability. By integrating evidence-based management strategies, clinicians can effectively mitigate the burden of postoperative DED, ensuring better surgical outcomes and enhanced patient satisfaction.

SUMMARY

- This prospective study included 340 patients aged between 45-75 years undergoing either phacoemulsification (PKE) or small incision cataract surgery (SICS).
- All the patients were assessed for baseline and postoperative dry eye using Schirmer's Test, Tear breakup time(TBUT), and corneal fluorescein staining.
- Results have shown that posteoperative DED peaked at one week (57.3%) and declined by four weeks (41.8%).
- Female patients (54.4%) were susceptible to developing DED than male patients (45.6%).
- Patients those aged 56-65 years (41.2%) were affected more, compared to the patients with the age of 66-75 years (33.8%) and 45-55 years (25%).
- Small incision cataract surgery (SICS) was associated with a higher incidence of DED (60.5% at one week vs 54.8% in PKE).
- 52.1% Patients with scleral incision and 47.9% patients with corneal incision developed DED at first and fourth week, but this difference was statistically insignificant.
- Additionally preservative – containing steroid drops significantly increased DED incidence (67.6%) compared to preservative-free formulations (32.4%).
- Patients with diabetes mellitus were more susceptible in the incidence of dry eye after 4 weeks among diabetics & non-diabetics, but this difference was statistically non-significant.
- There was a non-significant difference in the incidence of dry eye after 1 Week and after 4 weeks among smokers & non-smokers.
- Similarly, there was a non-significant difference in the incidence of dry eye after 1 Week and after 4 weeks among alcoholics & non-alcoholics.
- The number of severe cases reduced from 59 (after 1 week) to 24 (after 4 weeks). This difference in the grading of dry eye after 1 week and 4 weeks was significant.
- There was a non-significant difference in the incidence of dry eye after 1 and four weeks among different professions.

LIMITATIONS OF STUDY

- The study primarily assessed DED incidence at 1 week and 4 weeks postoperatively. A longer follow-up period would provide better insights into the long term effects of both the surgical techniques on DED.
- The outcome may have been influenced by individual surgeon experience and technique variability , which were not explicity accounted for in the study.
- Differences in postoperative treatment regimens could have influenced DED outcomes, as these were not uniformly standardized across all the patients.

REFERENCES

1. Jonas JB, Wang N, Yang X. Advances in cataract surgery outcomes and complications. *Clin Ophthalmol*. 2023;17:89-98.
2. Yu Y, Jiang J, Zhou D. Prevalence and management of dry eye after cataract surgery. *Eye Vis (Lond)*. 2022;9(1):45-52.
3. Chen Q, Li R, Tang X. Corneal nerve damage in cataract surgery: Implications for dry eye. *Br J Ophthalmol*. 2023;107(5):641-647.
4. Zhou H, Zhang X, Li Z. Meibomian gland dysfunction and cataract surgery outcomes. *Cornea*. 2022;41(6):761-767.
5. Gao X, Zhang Y, Li Q. Patient-reported outcomes in cataract surgery and dry eye disease. *Am J Ophthalmol*. 2023;245:56-62.
6. Li Y, Xu W, Wang Z. Advances in diagnostic tools for dry eye disease. *J Ophthalmol*. 2022;19(4):482-490.
7. Smith JA, Nguyen QD, Tang F. Emerging therapies for postoperative dry eye. *OphthalmolTher*. 2022;11(2):325-340.
8. Rosen E. Historical perspectives in cataract surgery. *Am J Ophthalmol*. 2022;246:12-18.
9. Mehta N, Wang L, Koch D. Femtosecond laser-assisted cataract surgery: Current status. *J Cataract Refract Surg*. 2021;47(6):743-750.
10. Burkhard DF, Jones YL. Evolution of phacoemulsification techniques. *J Cataract Refract Surg*. 2022;48(5):621-628.
11. Benz M, Liu L, Wright W. Intracameral antibiotics in cataract surgery. *J Cataract Refract Surg*. 2022;48(3):281-287.
12. Kohnen T, Klaproth OK, Spoerl E. Multifocal and EDOF IOLs in refractive cataract surgery. *Clin Ophthalmol*. 2023;17:45-55.

13. Smith JA, Nguyen QD, Tang F. Emerging trends in cataract surgery. *Ophthalmol Ther*. 2022;11(2):325-340.
14. World Health Organization. Cataract and refractive error prevention. Geneva: WHO; 2023.
15. Hussain R, Singh D, Patel V. Historical landmarks in cataract surgery. *Ophthalmic Hist Soc J*. 2020;12(1):5-15.
16. Li G, Peng Q. Innovations in IOL materials for cataract surgery. *Ophthalmol Vis Sci*. 2021;12(2):221-230.
17. Wang M, Zhou Y, Lin X. The role of viscoelastic agents in modern cataract surgery. *J Ocul Pharmacol Ther*. 2023;39(3):187-192.
18. Steinert RF, Li G. PCO prevention strategies in modern cataract surgery. *Surv Ophthalmol*. 2021;66(3):389-399.
19. Miller D, Waring G. Advances in toric IOL technology. *Ophthalmic Surg Lasers*. 2022;53(1):21-30.
20. Chen Q, Li R, Tang X. Innovations in phacoemulsification devices. *Ophthalmology*. 2023;130(4):561-568.
21. Burkhard DF, Tonnis B. Microincision cataract surgery: Current perspectives. *J Cataract Refract Surg*. 2022;48(7):621-628.
22. Mehta P, Asimakis P. Artificial intelligence in cataract surgery planning. *Eye Sci*. 2023;11(2):141-148.
23. Yu Y, Wang X. Corneal edema and management post cataract surgery. *J Ophthalmol*. 2023;20(4):543-548.
24. Liu Q, Jiang L. Retinal detachment following cataract surgery: A review. *Clin Ophthalmol*. 2022;16:92-100.
25. Zheng L, Chan K. Endophthalmitis prophylaxis: Current recommendations. *Ophthalmic Res*. 2023;15(3):251-261.

26. Friedman NJ, Pineda R. Dry eye management in cataract patients. *J Ocul Pharmacol Ther*. 2022;38(1):91-96.
27. Kim J, Choi S, Yoon J. Impact of femtosecond laser on refractive outcomes. *Asia Pac J Ophthalmol*. 2023;12(2):231-240.
28. Wang Y, Zhang H. Advances in trifocal IOLs. *Int J Ophthalmol*. 2022;14(7):975-980.
29. Jones JD, Roberts C. The impact of PCO on visual acuity. *Br J Ophthalmol*. 2023;107(5):321-326.
30. Smith T, Wilson A. Future directions in accommodative IOL technology. *Ophthalmol Sci*. 2022;9(3):101-110.
31. Rogers A, Singh J. Risk factors for CME post cataract surgery. *Clin Retina*. 2023;12(4):91-99.
32. Zhao X, Liu M. Optimizing visual outcomes in refractive cataract surgery. *J Cataract Refract Surg*. 2023;49(2):144-153.
33. Burdett S, Howard C. Corneal endothelial damage during phacoemulsification. *Am J Ophthalmol*. 2022;243:81-88.
34. Mehta R, Patel D. Role of omega-3 fatty acids in cataract-related DED. *Nutr Ophthalmol*. 2023;19(1):23-30.
35. Liu Z, Huang Y. Postoperative astigmatism management in cataract surgery. *Ophthalmic Vis Sci*. 2022;18(4):145-151.
36. Klein BE, Klein R. Epidemiology of cataract surgery in the aging population. *Arch Ophthalmol*. 2023;141(1):11-19.
37. Hill WE, Sudhir R. Advances in swept-source OCT for cataract surgery planning. *J Cataract Refract Surg*. 2022;48(9):1129-1135.
38. Taylor H, Jonas J. Global trends in cataract surgery. *Br J Ophthalmol*. 2023;107(6):741-750.
39. O'Brien PD, Chen J. Emerging techniques for lens fragment removal. *Ophthalmol Surg*. 2023;31(2):87-94.
40. Yang J, Sun Y. Tear film instability in postoperative dry eye. *Ocul Surf*. 2022;20(3):331-340.

41. Miller J, Zhang Q. Advances in viscoelastic materials in cataract surgery. *Clin Ophthalmol*. 2023;17:123-134.
42. Yu L, Park E. Thermal pulsation therapy in MGD management. *Eye Vis*. 2022;15(2):341-346.
43. Chen R, Li X. Light-adjustable IOLs: A review. *Clin Ophthalmol*. 2023;17:541-550.
44. Jonas JB, Wang N. Role of digital tools in cataract surgery outcomes. *J Ocul Sci*. 2022;19(1):13-20.
45. Hernandez J, Garcia M. Postoperative inflammation management. *Ophthalmol Today*. 2023;11(1):15-23.
46. Zhang X, Li Q. Personalized IOL selection in cataract surgery. *Ophthalmol Sci*. 2023;9(4):201-210.
47. Zhou Y, Wong T. Artificial intelligence in predicting cataract surgery outcomes. *Clin Ophthalmol*. 2023;17:331-340.
48. Gao X, Wang T. Advances in toric IOL design and outcomes. *Asia Pac J Ophthalmol*. 2023;12(3):341-350.
49. Liu W, Chen Y. Next-generation multifocal IOLs: Future perspectives. *J Cataract Refract Surg*. 2023;49(3):231-240.
50. Lin H, Zhang J. Preoperative dry eye optimization for cataract patients. *Eye Vis*. 2023;15(1):101-109.
51. Akpek EK, Amescua G, Farid M. Dry Eye Associated with Cataract Surgery: Mechanisms and Management. *Cornea.* 2023;42(5):517-526.
52. Wang MTM, Craig JP. Impact of Cataract Surgery on the Tear Film and Ocular Surface. *Ocul Surf.* 2023;21:12-22.
53. Bron AJ, Willshire C, Jones H. Cataract Surgery and Its Effect on Ocular Surface Disease. *Br J Ophthalmol.* 2022;106(7):921-928.
54. Liu C, Tan J, Zhang H. Postoperative Dry Eye Syndrome After Cataract Extraction: A Systematic Review. *J Cataract Refract Surg.* 2023;49(3):321-332.

55. Xiao Q, Jiang Y, He L. Inflammatory Response and Dry Eye Post-Phacoemulsification. *Clin Exp Ophthalmol.* 2022;50(1):13-21.
56. Zhou H, Wang J, Zhao M. Prevalence and Risk Factors of Dry Eye Disease After Cataract Surgery. *Am J Ophthalmol.* 2022;244:65-73.
57. Lee SM, Kim SH, Kim JH. Effect of Ocular Surface Changes on Visual Recovery After Cataract Surgery. *Eye Vis (Lond).* 2021;8(1):30.
58. Aragona P, Giannaccare G, Mencucci R. The Relationship Between Cataract Surgery and Meibomian Gland Dysfunction. *Ophthalmology.* 2022;129(4):452-461.
59. Lin Z, Wang Z, Li Y. Tear Film Stability and Cataract Surgery: A Prospective Study. *Cornea.* 2023;42(2):178-185.
60. Li N, He Y, Yang Q. Influence of Phacoemulsification on Tear Function in Diabetic and Non-Diabetic Patients. *J Ophthalmol.* 2022;2022:2094618.
61. Gao Y, Xu Y, Xie W. Role of Oxidative Stress in Postoperative Dry Eye Syndrome. *Int J Mol Sci.* 2022;23(7):3675.
62. Zhang W, Shi J, Luo L. Effects of Topical Anti-inflammatory Medications on Dry Eye After Cataract Surgery. *J Ocul Pharmacol Ther.* 2023;39(3):189-198.
63. Wu H, Tang L, Hu Z. Corneal Sensitivity Recovery Post-Cataract Surgery: A One-Year Study. *Clin Ophthalmol.* 2023;17:1453-1463.
64. Lu P, Chen X, Gao Y. Long-Term Impact of Cataract Surgery on Ocular Surface Changes. *BMC Ophthalmol.* 2022;22(1):57.
65. Yan Z, Sun H, Li R. The Effect of IOL Material on Postoperative Dry Eye Symptoms. *J Cataract Refract Surg.* 2022;48(6):789-796.
66. Smith JA, Roberts S, Chen Q. Influence of Surgical Techniques on Dry Eye Development. *Cornea.* 2023;42(8):1056-1062.
67. Gupta PK, Venkatesh R, Shetty R. Predicting Dry Eye After Cataract Surgery: A Machine Learning Approach. *J Ophthalmol.* 2023;2023:2345679.

68. Chang P, Zhang X. Impact of Femtosecond Laser-Assisted Cataract Surgery on Tear Film. *Ocul Surf.* 2021;19(3):343-351.
69. Rosenfield M, Reyes J, Mirza S. Prevalence and Risk Factors for Dry Eye in Diabetic Patients Undergoing Cataract Surgery. *Br J Ophthalmol.* 2023;107(2):231-239.
70. Chen Y, Han X, Wu L. Influence of Phacoemulsification on Tear Meniscus and Blink Rate. *Clin Exp Ophthalmol.* 2022;50(2):129-136.
71. Xing X, Liu Y, Jiang W. The Relationship Between Cataract Surgery and Tear Film Inflammation. *Am J Ophthalmol.* 2022;245:72-80.
72. Zhang Q, Liang Y, Zhao H. Effect of Omega-3 Supplementation on Dry Eye After Cataract Surgery. *Nutrients.* 2023;15(4):987.
73. Tian Y, Chen F, Lu W. Topical Cyclosporine for Management of Postoperative Dry Eye. *J Ocul Pharmacol Ther.* 2023;39(5):267-276.
74. Luo J, He Q, Tang X. Role of Preoperative Dry Eye Assessment in Cataract Surgery Patients. *J Cataract Refract Surg.* 2023;49(4):482-491.
75. Kim H, Lee J. Effect of Anti-Inflammatory Eye Drops on Dry Eye Symptoms After Surgery. *Ophthalmology.* 2022;129(7):810-819.
76. Wang Y, Li R, Qiu X. Role of Artificial Tears in Postoperative Ocular Surface Management. *BMC Ophthalmol.* 2022;22(1):110.
77. Xiao L, Zheng W, Xu F. The Effect of Corneal Nerve Regeneration on Dry Eye Symptoms After Cataract Surgery. *Cornea.* 2023;42(9):1201-1209.
78. Mao W, Chen L, Jin H. Tear Film Changes in Diabetic Patients Following Cataract Extraction. *J Ophthalmol.* 2023;2023:3765981.
79. Yang J, Sun Z, Wang Y. Clinical and Biochemical Markers of Dry Eye After Cataract Surgery. *Am J Ophthalmol.* 2022;244:145-153.
80. García-Catalán MR, Suárez-Tirado B, Vega-García A. Influence of Meibomian Gland Dysfunction on Postoperative Dry Eye. *J Cataract Refract Surg.* 2023;49(5):567-576.

81. Hong X, Lu X, Lin Y. Effect of Different Intraocular Lens Materials on Tear Film Stability. *Int J Ophthalmol.* 2022;15(2):272-279.
82. Cheng J, Liu X, Yu X. Effect of Cataract Surgery on Tear Proteomics. *Exp Eye Res.* 2023;229:109290.
83. Rao K, Mathur P. Role of Probiotic Therapy in Dry Eye Management Post-Surgery. *Nutr Ophthalmol.* 2023;19(2):67-75.
84. Tariq A, Khan Z, Ahmed N. Comparative Study of Hydrophilic and Hydrophobic IOLs on Ocular Surface Changes. *Ocul Surf.* 2023;21:45-52.
85. Liu F, Jiang P, Wang R. Effect of Vitamin D Deficiency on Postoperative Dry Eye Syndrome. *J Ocul Pharmacol Ther.* 2023;39(6):315-324.
86. Mehta P, Asimakis P. Corneal Sensitivity Loss and Recovery After Cataract Surgery. *J Cataract Refract Surg.* 2022;48(9):1135-1143.
87. Fu Y, Zhao Z, Wu M. Preoperative Tear Film Breakup Time as a Predictor of Dry Eye. *Br J Ophthalmol.* 2023;107(8):1021-1028.
88. Guan J, Xu L. Advances in Artificial Tear Formulations for Cataract-Related Dry Eye. *Ophthalmol Ther.* 2023;12(2):367-378.
89. Zhang W, Shi L, Liu Z. Plasma Rich in Growth Factors for Ocular Surface Healing. *J Ocul Pharmacol Ther.* 2023;39(7):419-428.
90. Wang X, He Y. Role of Mucin in Tear Film Stability After Cataract Surgery. *Exp Eye Res.* 2023;228:109275.
91. Lin Z, Wang Z, Li Y. Tear Film Stability and Cataract Surgery: A Prospective Study. *Cornea*. 2023;42(2):178–185.
92. Ross ME, Tighe S, Kim T. Postoperative dry eye symptoms following cataract surgery. *Curr Opin Ophthalmol*. 2021;32(4):294–299.
93. Schaumberg DA, Sullivan DA, Buring JE, Dana MR. Prevalence of dry eye syndrome among US women. *Am J Ophthalmol*. 2003;136(2):318–326.

94. Zhou H, Zhang X, Li Z. Meibomian gland dysfunction and cataract surgery outcomes. *Cornea*. 2022;41(6):761–767.
95. Kasetsuwan N, Satitpitakul V, Changul T, Jariyakosol S. Incidence and pattern of dry eye after cataract surgery. *PLoS One*. 2013;8(11):e78657.
96. Sahu P, Das G, Biswas NR, Nayak B. Evaluation of tear film parameters in patients undergoing phacoemulsification. *Int J Res Med Sci*. 2017;5(11):4787–4792.
97. Pradhan ZS, Ram J, Sukhija J, Lakra P. Cataract surgery and dry eye: A comparative analysis of phacoemulsification and manual small incision cataract surgery. *Int J Ophthalmol*. 2017;10(10):1538–1542.
98. Galor A, Feuer W, Kempen JH, et al. Adverse effects of smoking on patients with ocular inflammation. Br J Ophthalmol. 2010;94(7):848-853.
99. Weale R. Smoking and age-related maculopathies. Lancet. 2006 Oct 7;368(9543):1235-6.
100. Moss SE, Klein R, Klein BE. Prevalence of and risk factors for dry eye syndrome. Arch Ophthalmol. 2000 Sep;118(9):1264-8.
101. Tan LL, Morgan P, Cai ZQ, Straughan RA. Prevalence of and risk factors for symptomatic dry eye disease in Singapore. Clin Exp Optom. 2015 Jan;98(1):45-53.
102. Lee JH, Lee W, Yoon JH, Seok H, Roh J, Won JU: Relationship between symptoms of dry eye syndrome and occupational characteristics: the Korean National Health and Nutrition Examination Survey 2010-2012. BMC Ophthalmol. 2015, 15:147.
103. Bazeer S, Jansonius N, Snieder H, Hammond C, Vehof J: The relationship between occupation and dry eye. Ocul Surf. 2019, 17:484-90.
104. Rahman ZA, Sanip S: P2-493 computer vision syndrome: the association with ergonomic factors. J Epidemiol Community Health. 2011, 65:1.
105. Kasetsuwan N, Satitpitakul V, Changul T, Jariyakosol S. Incidence and pattern of dry eye after cataract surgery. PLoS One. 2013;8:e78657.
106. Venugopal KC, Krishnaraj PA, Chandan N. Evaluation of Dryness of Eyes after Manual Small Incision Cataract Surgery with Corneoscleral Tunnel Incision. Journal of Clinical and Diagnostic Research. 2012;6:1029–1033.
107. Manjula B, Ravi Babu B, Chaithanya Sravanthi KS. To Evaluate the Incidence And Severity

Pattern of Dry Eye After Cataract Surgery. IOSR Journal of Dental and Medical Sciences. 2017;16:1–3.

108. Jayshree MP, Shivkumar H, Monalisha P, Mallikarjun S. A Prospective study of Dry Eye after manual Small Incision Cataract Surgery in rural population of Bagalkot. J Clin Res Ophthalmol. 2017;4:25–29.

ANNEXURES – I

INFORMED CONSENT FORM

I confirm that Dr. MAYURI B SARUK has explained the purpose of research, the study procedure, the benefits, and the possible discomfort that I may experience in the language best understood by me. Therefore, I agree to participate as a subject in this research project and willfully consent for the same.

_____ _____

(Participant) (Date)

_____ _____

(Witness to above signature) (Date)

ಅಧ್ಯಯನ ವಿಷಯ ಕಾನ್ಸೆಂಟ ಫಾರ್ಮ

ಡಾ. ಮಯೂರಿ ಬಿ ಸರುಕ್, ನನಗೆ ಸಂಶೋಧನೆಯ ಉದ್ದೇಶ, ಅಧ್ಯಯನದ ವಿಧಾನ ಮತ್ತು ಸಂಭವನೀಯ ಅಸ್ವಸ್ಥತೆಗಳು ಮತ್ತು ನನ್ನ ಸ್ವಂತಭಾಷೆಯಲ್ಲಿ ನಾನು ಅನುಭವಿಸಬಹುದಾದ ಪ್ರಯೋಜನಗಳನ್ನು ವಿವರಿಸಿದ್ದೇನೆ ಎಂದು ನಾನು ಖಚಿತ ಪಡಿಸುತ್ತೇನೆ. ಮೇಲಿನ ಎಲ್ಲಾ ವಿಷಯಗಳನ್ನು ನನ್ನ ಸ್ವಂತ ಭಾಷೆಯಲ್ಲಿ ವಿವರವಾಗಿ ವಿವರಿಸಲಾಗಿದೆ ಮತ್ತು ನಾನು ಅದನ್ನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ. ಆದ್ದರಿಂದ, ಈ ಸಂಶೋಧನಾಯೋಜನೆಯಲ್ಲಿ ವಿಷಯವಾಗಿ ಭಾಗವಹಿಸಲು ಒಪ್ಪಿಗೆ ನೀಡಲು ನಾನು ಒಪ್ಪುತ್ತೇನ

~~(ಭಾಗವಹಿಸುವವರು)~~ _____~~(ದಿನಾಂಕ)~~

RISK AND DISCOMFORTS:

I understand that I may undergo some pain and discomfort during the examination or the treatment. This study's procedures are not expected to amplify these feelings associated with the usual course of treatment.

BENEFITS:

I know that my participation in the study of Dry eye after cataract surgery would help in finding the cause and early treatment which will help in the recovery of symptoms causing dry eye in cataract surgery.

I understand and accept the benefits, risks, and costs involved. I willingly give consent to take part in the study.

CONFIDENTIALITY: I understand that this study's medical information will be subject to privacy will become a part of hospital records.

Suppose the data are used for teaching purposes or publication in the medical literature. In that case, no name will be used, and other identifiers such as photographic images will be used only with written permission.

REQUEST FOR MORE INFORMATION:

I understand that I may ask for more questions about the study to Dr. SUNIL G BIRADAR in the Department of Ophthalmology, who will answer my queries or worries. I understand that I will be well informed of any significant new findings discovered during the study, which might influence my continued participation. A copy of this consent form is given to me for careful reading.

REFUSAL FOR WITHDRAWAL OF PARTICIPATION: I understand that I am participating in this study voluntarily and that I may withdraw consent or may refuse to participate and discontinue participation in the study at any time without prejudice. I also understand that Dr.MAYURI B SARUK may terminate my study's participation after explaining the reasons.

INJURY STATEMENT: I understand that any unlikely event of injury to me, resulting directly

from my study's participation, if such damage were reported promptly, I will be treated appropriately. But, no further compensation or reimbursement would be provided by the doctor or hospital. I understand that my agreement to participate in this study and not waiving any of my legal rights.

_____ _ _____

(participant) (Date)

I have explained to the patient name _____the purpose of the research, the procedures required and the possible risks to the best of my ability.

_____ _____

DR. MAYURI B SARUK (Investigator) (Date)

ANNEXURES -II

CASE PROFORMA

DEPARTMENT OF OPHTHALMOLOGY

BLDE UNIVERSITY'S SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, VIJAYAPURA-586103

THESIS TOPIC- A PROSPECTIVE STUDY OF DRY EYE AFTER CATARACT SURGERY

CASE PROFORMA

Case No: .....

Name: .....

Age: ..... years Sex: ..... IP no: .....

Occupation: ……..

Address: .....

Contact no: .....

Date of admission: ..... Date of Discharge: .....

Is the patient eligible for the study? (1-Yes, 2-No): .....

Has informed consent been given? (1-Yes, 2-No): .....

Chief Complaints:

1. Diminution of vision: Right Eye..... Duration: ..... days/months/years

Left Eye .....Duration:.....days/months/years

2. Others (if any): .....

History of Present Illness:

1. Diminution of vision: Insidious (1)or Sudden(2): .....

Progressive (1)or Non-progressive(2) .....

2. Foreign body sensation: Present (1)or Absent:(2) .....

3. Pricking sensation: Present (1)or Absent: (2) .....

4. Pain in eyes: Present(1) or Absent: (2) .....

5. Redness: Present (1) or Absent: (2) .....

6. Watering: Present(1) or Absent: (2) .....

7. Discharge: Present(1) or Absent: (2) .....

8. Diplopia: Present(1) or Absent: (2) .....

9. H/O present trauma: Present(1) or Absent: (2) .....

Past history:

1. H/O past trauma to eye: Present(1) or Absent: (2) .....

2. Ocular surgery: Present(1) or Absent: (2) .....

Type of surgery: ..... When performed? : .....

3. Diabetes: Present(1) or Absent: (2) .....

Duration: ..... Medication: .....

4. Hypertension: Present(1) or Absent: (2) .....

Duration: ..... Medication: .....

5. CAD: Present (1) or Absent: (2) .....

Duration: ..... Medication: .....

6. Any other medical disorder: .....

7. Drug history : .....

Personal History:

1. Smoking: Present or Absent: .....Duration: .....

2. Alcohol intake: Present or Absent: ..... Duration: .....

Family History:

Not significant

General Physical Examination:

1. Built: .....

2. Pulse: ...../minute

3. Blood pressure: ...../..... mmHg

4. Respiratory rate: .....cycles per minute

5. Others:…….

Systemic Examination:

1. CVS: Normal-1 ,Abnormal-2

If 2
specify.....

2.CNS: Normal-1 ,Abnormal-2
If 2
specify.....

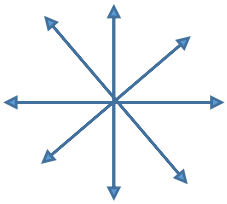
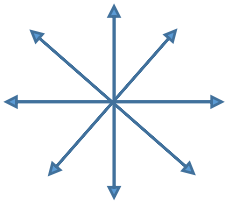
3.Respiratory System- Normal-1 ,Abnormal-2
If 2
specify.....

4.Per abdomen: Normal-1 ,Abnormal-2
If 2
specify.....

Visual Acuity

	RE	LE
DISTANT		
PINHOLE		
NEAR		
AIDED		

OCULAR EXAMINATION

	RE	LE
External Appearance		
Ocular motility		
Sclera: 1- Normal 2- Congested	☐	☐
Conjunctiva 1- Normal 2- Conjunctival Congestion 3- Conjuctival xerosis	☐	☐
Cornea 1- Normal 2- Opacity 3- Corneal xerosis (FLUORESCEIN STAINING)	☐	☐

Anterior Chamber 1- Normal depth 2- Shallow 3- Deep	☐	☐
Iris 1- Colour and pattern 2- Persistent pupillary membrane 3- Any adhesions 4- New Vessels Normal(N), abnormal (AN) Present (+), absent(-)	☐	☐
Pupil **Shape:** 1-Round and regular; 2- Irregular	**Size**.....mm ☐	**Size** ..... mm ☐
Reaction: Direct: 1-Present; 2-Absent Indirect: 1-Present; 2-Absent Near reflex: 1-Present; 2-Absent	☐ ☐ ☐	☐ ☐ ☐
Pseudo exfoliation granules in margin	☐	☐

Lens **Clarity:** 1-Clear; 2-Opaque 1- Cataract; 2- PCIOL If a cataract is present: 1- Immature 2- Mature 3- Hyper mature A) Cortical cataract (1-Present;2-Absent) B) Nuclear sclerosis (1-Present;2-Absent) If present: GRADE: C) Posterior Subcapsular cataract (1-Present 2-absent)	☐ ☐ ☐ ☐ ☐ …… ☐	☐ ☐ ☐ ☐ ☐ …….. ☐
• **Lacrimal duct patency** **(**1-Patent, 2-Regurgitation, 2A-Clear fluid; 2B-Mucopurulent; 2C- Blocked) Schimer I Test (SIT)	☐	☐

FUNDUS EXAMINATION:

Fundus	**Right eye**	**Left eye**
Glow		
Media		
Disc		
CD ratio		
Blood vessels		
Background		
Macula		

Diagnosis

Investigations

HIV

HBsAg

Random blood sugar:.....mg/dl

OPERATIVE PROCEDURE:

Small Incision Cataract Surgery- ☐
Phacoemulsification - ☐

DATE OF SURGERY: .....

OPERATING EYE: Left / Right.....

Advice on discharge

1.TAB.COMBIFLAM 400MG/TAB BRUFEN 400MG BD
2.TAB OFLOX 200MG/TAB CIPRODAC 500MG BD
3.E/D OFLOX-D/ E/D GATIQUIN- P/ E/D MAXIM- D 1HOURLY
4.E/D MOSI/ E/D CIPLOX 4 TIMES/DAY
5.E/D NEPALACT/ E/D IGESIC 3 TIMES/DAY

IF ANY OTHER MEDICATIONS

POSTOPERATIVE FOLLOW-UP 1 WEEK

External appearance.....

Incision wound.....

Conjunctiva.....

Cornea (FLUORESCEIN STAINING)

Grade 0 – 0 Dots ☐

Grade 1- 1-15 Dots ☐

Grade 2- 16-30 Dots ☐

Grade 3- 31 or >31 dots ☐

Anterior chamber.....

Pupil.....

Lens.....….....

Visual acuity.....

Schimer I Test (SIT) Length of moist strip measured after 5 min.	SEVERITY	Observed values
SIT > 10 mm/min SIT > 5mm/5min < 10 mm/5min SIT >3mm/5min <5mm/5min SIT <3mm/5min	NORMAL MILD MODERATE SEVERE	

Corneal flouroscence staining grading scale	SEVERITY	Observed values
TUBT >10sec TBUT >5 sec TBUT <10 sec TBUT >3 sec TBUT <5 sec TBUT <3sec	NORMAL MILD MODERATE SEVERE	

POSTOPERATIVE FOLLOW-UP 4 WEEKS

External appearance.....

Incision wound.....

Conjunctiva.....

Cornea (FLUORESCEIN STAINING)

Grade 0 – 0 Dots ☐

Grade 1- 1-15 Dots ☐

Grade 2- 16-30 Dots ☐

Grade 3- 31 or >31 dots ☐

Anterior chamber.....

Pupil.....

Lens.....

Visual acuity.....

Schimer I Test (SIT) Length of moist strip	SEVERITY	Observed values

measured after 5 min.		
SIT > 10 mm/min SIT > 5mm/5min < 10 mm/5min SIT >3mm/5min <5mm/5min SIT <3mm/5min	NORMAL MILD MODERATE SEVERE	

Tear film Break – up Time (TBUT) Time deference between the last blink and the presence of the first blank spot on the corneal surface	SEVERITY	Observed values
TUBT >10sec TBUT >5 sec TBUT <10 sec TBUT >3 sec TBUT <5 sec TBUT <3sec	NORMAL MILD MODERATE SEVERE	

Dr. Mayuri Saruk
Investigator
PG student
Department of Ophthalmology

Dr. Sunil G Biradar
Thesis Guide
Professor
Department of Ophthalmology

ANNEXURES – III

COLOR PLATES

Fig.4 Schirmers and fluorescein staining test strips

Fig.5 Schirmers test

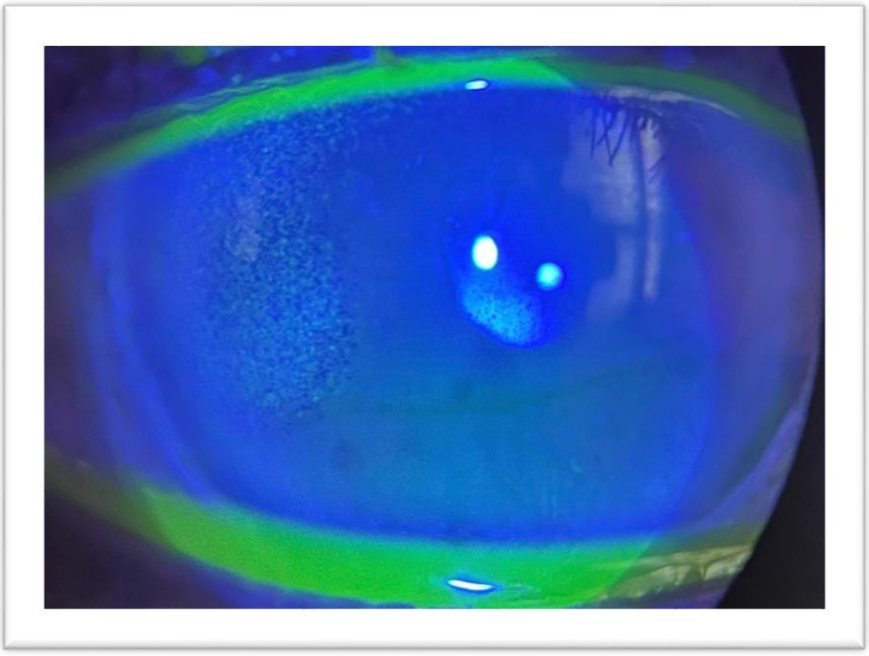
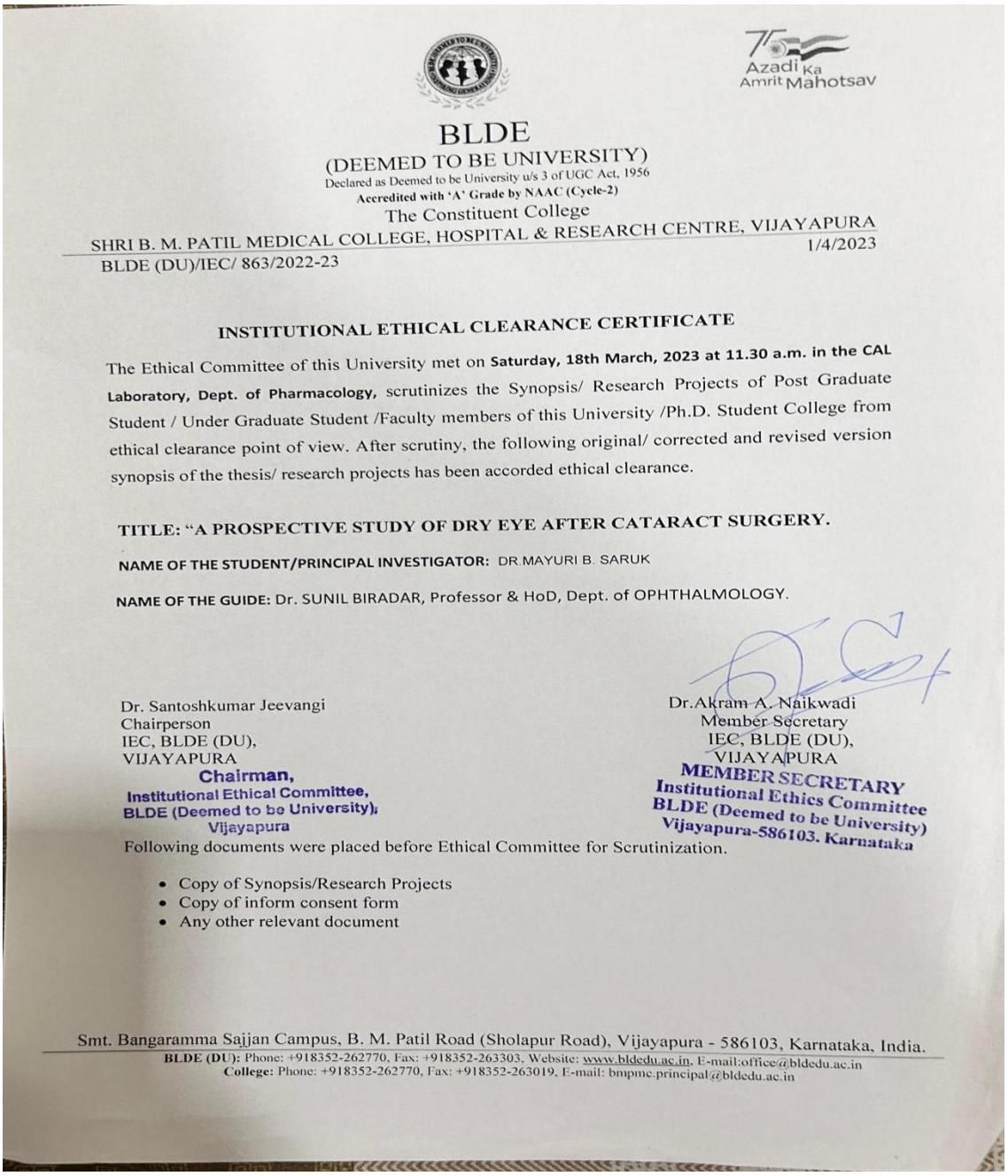


Fig.6 Corneal Fluoresceine staining

ANNEXURES – IV

ETHICAL CLEARANCE CERTIFICATE



BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
Accredited with 'A' Grade by NAAC (Cycle-2)
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 863/2022-23 1/4/2023

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Saturday, 18th March, 2023 at 11.30 a.m. in the CAL Laboratory, Dept. of Pharmacology,** scrutinizes the Synopsis/ Research Projects of Post Graduate Student / Under Graduate Student /Faculty members of this University /Ph.D. Student College from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "A PROSPECTIVE STUDY OF DRY EYE AFTER CATARACT SURGERY.

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: DR.MAYURI B. SARUK

NAME OF THE GUIDE: Dr. SUNIL BIRADAR, Professor & HoD, Dept. of OPHTHALMOLOGY.

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA
Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University),
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA
MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103. Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

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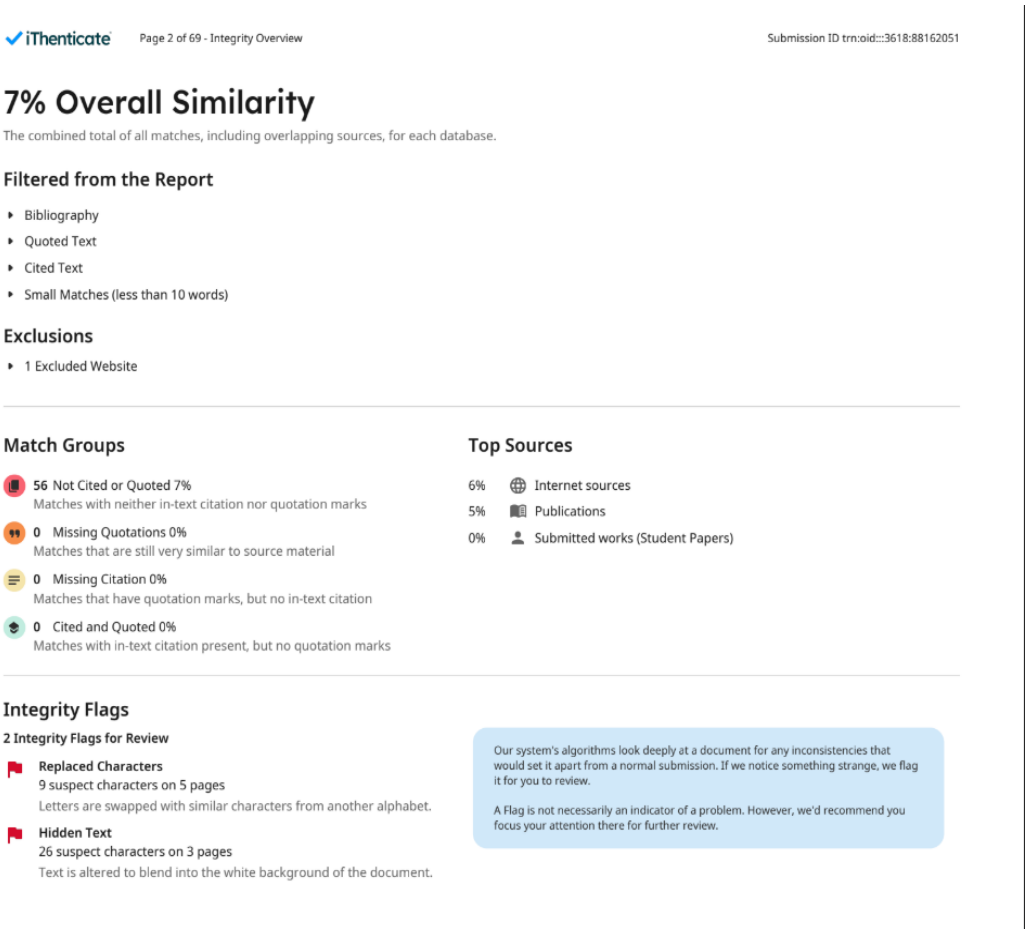
ANNEXURES – V

PLAGARISM REPORT



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ANNEXURES – VI

KEY TO MASTER CHART

TBUT	Tear Break-Up Time
IOP	Intraocular pressure
DED	Dry eye disease

S.No	Name	IP Number	occupation	Gender	Age (Years)	Smokers (Yes=1;No=0)	Alcholics (Yes=1;No=0)	eye to be operated	preoperative Schirmers Test(In mm)	Preoperative TBUT(In SEC)	Preoperative Corneal Staining	Surgical Technique	scleral icision=1, corneal incision=2	Diabetes	Hypertension	Topical_Medications(yes=1, no=0)	Systemic_Medications(yes=1,no=0)	IOP(mmHg)	Previous Ocular_Surgery	Postop_Med_Preservatives Yes = 1 No= 0	Pricking	Redness	Watering	Pain	Burning	Schirmer Test at 1 Week (mm)	Schirmer Test at 4 Weeks (mm)	TBUT at 1 Week (sec)	TBUT at 4 Weeks (sec)	Corneal Staining at 1week	Corneal Staining at 4week	DM (Yes=1, No=0)	HTN (Yes=1, No=0)	Grade of DED	DED at 1 Week (Yes=1, No=0)	DED at 4 Weeks (Yes=1, No=0)
1	sidaraya h	236411	Teacher	Male	45	0	1	RE	20	10	0	SICS	1	0	0	0	1	13	0	1	0	0	0	0	0	10	10	7	11	2	3	1	1	Severe	0	1
2	yallavva D	255743	Homaker	Female	62	0	0	RE	18	11	0	Phacoemulsification	2	1	0	0	0	13	0	0	0	0	0	0	0	7	10	6	10	1	3	1	1	Mild	0	1
3	Dastagirsab m	108366	Farmer	Male	65	1	1	LE	15	13	0	Phacoemulsification	2	1	0	0	1	11	0	0	0	0	0	0	1	10	8	7	11	2	2	1	0	Severe	1	1
4	Mahadevi G	193354	Homaker	Female	72	0	0	RE	17	10	0	SICS	1	0	0	0	1	11	0	1	0	0	0	0	0	9	9	8	11	3	1	1	1	Moderate	1	1
5	basappa B	237670	Farmer	Male	53	1	1	LE	18	14	0	SICS	1	0	0	0	1	15	0	1	1	1	0	0	1	6	9	8	7	3	3	0	1	Mild	1	0
6	shantavva D	237714	Homaker	Female	51	0	0	LE	19	12	0	SICS	1	0	1	0	0	10	0	1	0	1	0	1	0	9	7	9	10	1	2	1	0	Mild	0	1
7	balu rathod	389804	Farmer	Male	58	1	0	LE	18	13	0	SICS	1	0	1	0	1	11	0	1	0	0	0	0	0	9	6	9	9	3	1	1	1	Severe	0	1
8	Mayavva H	180694	Homaker	Female	46	0	0	RE	15	11	0	SICS	1	1	0	0	1	13	0	1	1	1	1	0	1	9	9	7	7	3	1	0	1	Severe	1	0
9	sidamma I	168097	Homaker	Female	72	0	0	LE	17	14	0	Phacoemulsification	2	0	0	0	0	16	0	0	0	0	1	0	1	10	10	10	11	3	3	0	0	Severe	0	0
10	shantaram	185269	Retired	Male	74	0	0	RE	19	13	0	Phacoemulsification	2	1	1	0	1	12	0	0	0	0	1	0	0	10	10	8	9	2	1	0	1	Moderate	0	1
11	mayavva	162063	Homaker	Female	72	0	0	RE	18	12	0	SICS	1	0	0	0	0	12	0	1	0	1	1	0	0	9	9	5	7	3	2	0	1	Severe	1	1
12	laxmibai c	256006	Homaker	Female	56	0	0	RE	19	11	0	Phacoemulsification	2	1	1	0	1	14	0	0	0	0	1	0	1	8	8	6	11	3	1	0	1	Severe	0	1
13	sidanan k	255226	Farmer	Male	61	1	1	RE	18	10	0	Phacoemulsification	2	1	1	0	0	12	0	0	0	1	0	0	0	10	10	9	7	3	3	0	0	Severe	1	0
14	basamma T	255161	Homaker	Female	52	0	0	RE	20	12	0	SICS	1	0	0	0	0	11	0	1	1	0	0	0	1	5	10	6	8	3	3	0	1	Severe	1	1
15	dastagirsab m	185060	Retired	Male	72	0	1	RE	17	13	0	Phacoemulsification	2	0	0	0	0	19	0	0	0	0	1	0	0	10	10	9	9	3	2	0	1	Mild	1	0
16	sidavva B	254907	Homaker	Female	47	0	0	RE	21	12	0	Phacoemulsification	2	0	1	0	1	18	0	0	0	0	1	0	1	6	9	7	8	1	1	0	1	Moderate	0	1
17	basamma	254605	Homaker	Female	65	0	0	RE	20	12	0	SICS	1	0	0	0	0	11	0	1	1	1	1	0	1	9	9	6	7	2	1	1	1	Severe	1	0
18	basappa G	224670	Farmer	Male	63	1	1	LE	17	11	0	Phacoemulsification	2	0	0	0	1	14	0	0	1	1	1	0	0	10	7	9	10	3	3	1	0	Severe	0	0
19	mallangaoda p	277106	Farmer	Male	56	1	1	LE	16	11	0	Phacoemulsification	2	0	1	0	0	11	0	0	0	1	0	0	1	9	10	5	8	2	2	1	1	Severe	0	1
20	mahadevi C	310266	Homaker	Female	70	0	0	RE	18	12	0	Phacoemulsification	2	0	0	0	0	17	0	0	0	0	1	1	0	10	8	5	10	3	1	0	1	Moderate	0	1
21	pavadeppa c	305798	Retired	Male	72	0	1	LE	17	14	0	Phacoemulsification	2	0	0	0	1	18	0	0	0	0	1	0	0	10	9	8	6	3	3	0	1	Severe	1	0
22	shantabai R	232761	Homaker	Female	49	0	0	RE	22	11	0	Phacoemulsification	2	0	1	0	1	16	0	0	0	0	0	0	0	9	9	10	8	2	2	0	0	Severe	1	0
23	Kutabai N	298561	Homaker	Female	47	0	0	LE	19	13	0	Phacoemulsification	2	0	0	0	0	12	0	0	0	0	1	0	0	10	6	5	9	2	2	1	1	Mild	0	0
24	vittal H	300510	Farmer	Male	68	1	1	LE	20	12	0	SICS	1	0	0	0	1	18	0	1	0	1	0	1	1	5	8	10	6	3	1	0	1	Moderate	1	0
25	mallappa C	310266	Farmer	Male	47	0	1	LE	18	12	0	SICS	1	0	1	0	1	12	0	1	1	0	1	1	0	6	8	6	7	2	3	0	0	Mild	0	1
26	mahadevi C	310272	Homaker	Female	50	0	0	LE	17	12	0	SICS	1	1	0	0	1	14	0	1	0	1	1	1	0	9	9	6	6	2	1	1	1	Severe	0	0

27	kantabai N	298561	Homaker	Female	67	0	0	LE	19	11	0	Phacoemulsification	2	0	1	0	0	18	0	0	1	1	0	1	0	6	10	7	10	3	1	1	1	Severe	0	1
28	rahimbee	336802	Homaker	Female	66	0	0	LE	16	13	0	SICS	1	0	1	0	0	12	0	1	0	0	1	0	0	6	10	9	6	2	2	0	0	Severe	0	1
29	balu S	377106	Farmer	Male	55	1	1	RE	18	12	0	Phacoemulsification	2	0	0	0	1	12	0	0	1	1	0	1	0	7	9	6	8	1	1	0	0	Severe	0	0
30	sarubai L	349048	Homaker	Female	50	0	0	RE	20	13	0	Phacoemulsification	2	0	0	0	0	16	0	0	1	0	1	0	1	10	8	5	10	3	1	1	1	Severe	0	1
31	akkamma M	10935	Homaker	Female	47	0	0	RE	18	12	0	Phacoemulsification	2	0	0	0	1	13	0	0	1	0	0	0	1	10	9	10	6	3	3	0	0	Severe	1	0
32	bajirao k	386828	Retired	Male	71	0	0	LE	18	13	0	SICS	1	0	0	0	1	10	0	1	0	0	1	0	1	7	10	5	8	2	2	0	0	Severe	0	0
33	malappa	311265	Farmer	Male	60	1	1	LE	19	11	0	Phacoemulsification	2	0	0	0	1	13	0	0	0	0	0	0	0	11	9	8	7	3	0	1	1	Mild	1	0
34	kamala s	8713	Homaker	Female	73	0	0	RE	19	10	0	Phacoemulsification	2	1	1	0	1	13	0	0	0	0	1	1	0	10	10	7	7	3	3	0	0	Moderate	0	1
35	bourawwa n	391492	Homaker	Female	73	0	0	RE	15	12	0	Phacoemulsification	2	1	0	0	1	16	0	0	1	0	0	0	0	7	9	7	6	1	0	0	0	Severe	0	1
36	ramangauda	8599	Farmer	Male	52	1	1	RE	19	13	0	SICS	1	1	0	0	0	17	0	1	0	0	1	1	0	10	8	7	8	3	1	1	0	Severe	1	1
37	sidamma	1295	Homaker	Female	50	0	0	RE	20	10	0	Phacoemulsification	2	0	1	0	1	10	0	0	0	0	1	0	0	10	7	7	8	3	3	1	1	Mild	0	1
38	ningappa k	9000	Farmer	Male	53	1	0	RE	16	13	0	Phacoemulsification	2	0	0	0	0	14	0	0	0	1	1	0	0	6	6	5	9	3	1	0	0	Severe	1	1
39	mahadevi n	8130	Homaker	Female	69	0	0	LE	18	12	0	SICS	1	0	1	0	0	16	0	1	0	1	1	0	0	10	10	6	11	2	2	1	0	Mild	0	1
40	shamlu k	8658	Farmer	Male	51	1	1	LE	16	14	0	Phacoemulsification	2	0	0	0	1	17	0	0	0	0	1	0	1	10	10	5	9	1	0	0	1	Severe	0	1
41	indrawwa p	8180	Homaker	Female	48	0	0	LE	18	12	0	SICS	1	0	0	0	1	13	0	1	0	0	0	1	0	10	9	10	8	3	2	0	0	Moderate	0	0
42	gauravva g	18879	Homaker	Female	59	0	0	RE	20	12	0	SICS	1	0	1	0	1	13	0	1	1	1	0	0	0	9	6	8	6	1	1	0	0	Moderate	1	1
43	bhimappa m	3377	Teacher	Male	45	0	1	RE	19	13	0	Phacoemulsification	2	0	1	0	1	13	0	0	1	0	0	0	0	10	7	10	9	3	3	0	1	Mild	1	0
44	basamma L	33531	Homaker	Female	67	0	0	RE	18	12	0	SICS	1	1	1	0	0	19	0	1	1	1	1	1	0	7	10	6	8	0	0	1	0	Mild	0	1
45	mananda S	33532	Homaker	Female	74	0	0	LE	18	11	0	SICS	1	0	1	0	0	15	0	1	0	0	1	0	1	9	8	10	8	2	2	0	0	Severe	0	1
46	lakkavva T	32312	Homaker	Female	60	0	0	LE	19	10	0	SICS	1	0	1	0	1	16	0	1	1	0	0	1	0	10	7	5	9	2	2	1	1	Moderate	1	0
47	siddanan	33586	Farmer	Male	63	1	1	RE	20	13	0	SICS	1	0	0	0	0	11	0	1	1	0	1	0	0	9	9	5	6	2	2	0	1	Mild	0	1
48	sidamma	3265	Homaker	Female	55	0	0	LE	17	12	0	Phacoemulsification	2	0	0	0	0	14	0	0	1	0	1	0	0	9	6	7	11	3	3	0	1	Severe	1	0
49	sangavva K	32347	Homaker	Female	72	0	0	RE	16	10	0	Phacoemulsification	2	0	1	0	0	13	0	0	1	1	1	0	0	8	9	9	8	3	3	0	1	Mild	0	1
50	malakavva L	33505	Homaker	Female	66	0	0	RE	17	11	0	SICS	1	0	1	0	0	12	0	1	0	0	0	0	0	6	9	8	7	2	2	0	1	Mild	0	1
51	somaray	33655	Retired	Male	72	0	0	LE	18	13	0	SICS	1	1	1	1	0	16	0	1	1	1	0	0	1	9	10	5	8	2	2	1	0	Mild	0	1
52	budamma S	32302	Homaker	Female	51	0	0	LE	20	12	0	Phacoemulsification	2	1	0	1	0	15	0	0	0	1	0	1	1	10	10	8	8	1	1	0	1	Mild	1	1
53	siddavva	32523	Homaker	Female	55	0	0	LE	20	12	0	SICS	1	1	0	1	0	14	0	1	0	0	1	1	1	7	10	5	10	2	2	0	1	Severe	0	1
54	basappa	31566	Farmer	Male	58	1	1	LE	19	12	0	Phacoemulsification	2	1	1	1	0	15	0	0	0	1	0	1	0	9	9	8	8	0	0	0	1	Mild	0	1
55	manappa V	32313	Farmer	Male	69	1	1	RE	16	10	0	Phacoemulsification	2	0	0	0	1	16	0	0	1	0	0	0	1	8	10	10	9	2	1	0	0	Severe	1	0
56	mallamma I	32338	Homaker	Female	74	0	0	RE	18	13	0	Phacoemulsification	2	1	1	1	0	14	0	0	1	0	1	0	0	10	8	7	8	1	0	1	0	Moderate	0	0
57	putalabai	33484	Homaker	Female	51	0	0	RE	19	14	0	SICS	1	0	1	1	0	15	0	1	1	1	1	0	0	10	10	10	8	3	3	0	0	Mild	1	1
58	mahadevi J	33617	Homaker	Female	51	0	0	LE	17	11	0	SICS	1	0	0	0	1	14	0	1	1	0	1	0	1	9	9	8	11	1	1	1	1	Mild	0	1

59	bouramma k	33510	Homaker	Female	45	0	0	RE	19	10	0	Phacoemulsification	2	0	1	1	0	16	0	0	0	0	0	1	0	6	10	6	6	3	3	1	1	Moderate	1	0
60	honavva T	33608	Homaker	Female	74	0	0	LE	16	10	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	0	0	0	0	10	10	7	6	2	1	1	0	Severe	0	0
61	murageppa M	32305	Farmer	Male	50	0	1	RE	17	14	0	SICS	1	0	0	0	1	10	0	1	0	0	1	0	1	10	9	10	8	1	1	1	1	Mild	1	0
62	yashavantaray B	32304	Farmer	Male	66	1	1	LE	18	11	0	SICS	1	0	1	1	0	14	0	1	0	1	0	0	0	6	10	9	8	3	2	0	0	Severe	1	1
63	paramma P035205		Homaker	Female	47	0	0	RE	19	12	0	Phacoemulsification	2	1	0	1	0	15	0	0	0	1	0	1	0	8	9	6	7	3	3	0	0	Moderate	0	1
64	shalubai C	284429	Homaker	Female	49	0	0	LE	19	12	0	SICS	1	0	1	1	1	15	0	1	0	1	0	0	0	6	10	5	11	2	2	0	0	Moderate	1	0
65	shivappa S	32336	Retired	Male	71	0	0	RE	19	11	0	Phacoemulsification	2	0	0	0	1	14	0	0	0	1	0	0	1	10	9	9	9	1	1	0	1	Mild	1	0
66	biyamma G	210204	Homaker	Female	64	0	0	LE	17	12	0	Phacoemulsification	2	0	1	1	0	19	0	0	1	0	0	0	1	6	10	8	8	2	0	1	0	Severe	1	0
67	sidappa W	33477	Retired	Male	72	0	0	RE	18	11	0	SICS	1	0	0	0	1	16	0	1	0	0	0	0	1	10	9	8	9	3	2	0	0	Moderate	0	1
68	prakash	33443	Teacher	Male	48	1	1	LE	16	13	0	SICS	1	1	0	1	0	19	0	1	1	0	0	0	0	7	10	5	6	1	1	0	1	Moderate	0	1
69	mallamma	48821	Homaker	Female	62	0	0	RE	19	12	0	Phacoemulsification	2	0	1	1	1	17	0	0	1	0	0	0	0	7	9	9	8	1	1	0	0	Moderate	1	1
70	sangamma H	9473	Homaker	Female	60	0	0	LE	17	13	0	Phacoemulsification	2	1	0	1	0	16	0	0	0	0	1	1	0	6	10	9	10	1	0	0	1	Moderate	1	1
71	sakkubai D	118762	Homaker	Female	65	0	0	RE	18	12	0	Phacoemulsification	2	1	0	1	1	14	0	0	0	1	0	0	0	9	10	10	10	1	0	1	1	Severe	1	0
72	manohar Y	40649	Farmer	Male	52	1	1	RE	17	13	0	Phacoemulsification	2	0	1	1	1	10	0	0	0	0	1	1	0	6	9	8	6	3	3	0	0	Severe	1	0
73	ramalabai C	65450	Homaker	Female	64	0	0	LE	17	14	0	SICS	1	0	1	1	1	14	0	1	0	0	0	1	0	9	10	5	9	3	2	0	1	Mild	0	1
74	shivappa k	40631	Farmer	Male	49	1	1	LE	18	10	0	Phacoemulsification	2	1	0	1	1	19	0	0	1	0	0	1	0	10	9	8	7	0	0	0	1	Moderate	1	0
75	ravateppa N	40593	Retired	Male	71	0	0	RE	20	11	0	Phacoemulsification	2	1	1	1	0	11	0	0	0	1	1	0	1	9	10	5	6	2	2	1	1	Moderate	0	1
76	devendra	48821	Farmer	Male	56	1	1	RE	20	12	0	Phacoemulsification	2	1	0	1	0	14	0	0	0	1	0	0	0	10	10	5	6	0	0	0	1	Severe	0	1
77	mahadevi g	33511	Homaker	Female	45	0	0	RE	18	11	0	Phacoemulsification	2	1	0	1	0	14	0	0	0	0	0	1	0	10	9	7	7	3	2	0	1	Severe	0	1
78	Ningayya m	40645	Farmer	Male	49	1	1	RE	20	12	0	SICS	1	0	0	0	0	11	0	1	1	0	0	1	0	9	10	5	11	3	3	1	0	Mild	0	1
79	mahadevi S	65342	Homaker	Female	68	0	0	LE	21	10	0	Phacoemulsification	2	0	1	1	1	14	0	0	1	1	1	0	1	10	10	5	6	0	0	0	1	Moderate	0	0
80	basappa T	176543	Farmer	Male	51	1	1	LE	22	12	0	SICS	1	0	1	1	0	13	0	1	1	0	0	1	1	5	9	10	6	1	1	1	0	Severe	1	0
81	sangamma t	9676	Homaker	Female	74	0	0	LE	19	12	0	SICS	1	1	1	1	0	10	0	1	0	0	0	0	1	6	10	6	11	3	2	1	0	Moderate	0	1
82	husenamma	74158	Homaker	Female	49	0	0	RE	22	11	0	SICS	1	0	1	1	1	12	0	1	1	1	1	0	1	10	9	6	8	2	1	0	1	Mild	0	1
83	sakkubai G	78764	Homaker	Female	66	0	0	RE	17	11	0	Phacoemulsification	2	0	0	0	1	10	0	0	1	1	0	0	0	9	10	7	11	3	1	1	1	Mild	0	0
84	sidray B	56966	Farmer	Male	67	1	1	LE	18	10	0	SICS	1	0	0	0	1	10	0	1	1	0	0	0	0	10	9	5	9	2	2	0	0	Moderate	1	1
85	shivappa	40038	Farmer	Male	49	1	1	RE	20	10	0	Phacoemulsification	2	0	0	0	1	13	0	0	1	1	0	0	0	10	10	9	8	3	2	1	1	Moderate	0	0
86	neelamma	75583	Homaker	Female	52	0	0	RE	21	11	0	SICS	1	0	0	0	0	14	0	1	0	1	1	1	0	5	9	6	6	1	1	0	1	Severe	1	0
87	B patil	167168	Farmer	Male	56	1	1	RE	18	12	0	Phacoemulsification	2	1	0	1	0	13	0	0	1	0	0	0	0	10	10	8	9	1	0	0	0	Severe	0	0
88	shantabai	75628	Homaker	Female	61	0	0	LE	17	13	0	SICS	1	0	1	1	1	16	0	1	1	1	0	0	0	10	9	9	10	2	1	0	1	Moderate	0	1
89	surekha	76439	Homaker	Female	47	0	0	LE	19	10	0	SICS	1	1	0	1	1	14	0	1	0	1	0	0	1	11	10	8	8	3	3	1	1	Severe	1	0
90	somannaB	33511	Farmer	Male	56	1	1	RE	20	14	0	Phacoemulsification	2	0	0	0	0	19	0	0	0	1	1	0	1	10	10	9	6	0	0	0	0	Mild	1	1

91	malashree P	56972	Homaker	Female	45	0	0	LE	19	11	0	SICS	1	0	0	0	1	13	0	1	1	1	0	0	1	10	9	6	6	2	2	1	0	Severe	1	0
92	bsavva G	82925	Homaker	Female	51	0	0	RE	16	14	0	Phacoemulsification	2	1	1	1	0	11	0	0	0	0	1	1	1	10	10	10	11	3	3	0	0	Severe	0	1
93	namdev H	33511	Retired	Male	72	0	0	LE	20	12	0	SICS	1	1	1	1	0	13	0	1	0	0	0	1	1	10	9	7	9	1	0	1	1	Mild	0	1
94	sangappa K	65461	Farmer	Male	53	1	1	LE	21	12	0	Phacoemulsification	2	0	0	0	1	11	0	0	1	0	1	1	0	10	10	8	7	0	0	0	1	Mild	0	1
95	shankareppa U	65468	Retired	Male	72	0	1	LE	21	11	0	Phacoemulsification	2	1	0	1	1	11	0	0	0	0	1	1	0	9	10	8	11	1	0	1	1	Moderate	1	1
96	golallappa t	65469	Farmer	Male	63	1	1	RE	18	11	0	Phacoemulsification	2	0	1	1	1	17	0	0	0	0	0	0	1	10	9	8	6	0	0	1	1	Severe	0	0
97	mahadevi m	802925	Homaker	Female	47	0	0	LE	18	11	0	SICS	1	0	0	0	0	12	0	1	0	1	0	0	1	10	10	9	10	2	0	1	1	Severe	1	0
98	sushilabai S	64803	Homaker	Female	64	0	0	RE	19	14	0	SICS	1	0	1	1	1	18	0	1	0	1	0	0	0	10	10	8	11	2	2	1	0	Moderate	1	1
99	pavadeppa	65474	Farmer	Male	52	1	1	RE	20	14	0	SICS	1	0	1	1	0	13	0	1	0	1	0	0	1	9	9	9	9	1	1	1	0	Severe	0	1
100	abdulrazak m	366787	Teacher	Male	48	1	1	LE	22	13	0	SICS	1	0	0	0	0	15	0	1	0	1	1	1	0	10	10	8	6	3	3	0	0	Moderate	1	0
101	gaourabai T	80848	Homaker	Female	68	0	0	LE	18	12	0	Phacoemulsification	2	0	0	0	1	19	0	0	1	1	0	0	0	10	9	7	9	3	1	1	1	Mild	1	1
102	sundarabai s	88736	Homaker	Female	63	0	0	LE	21	13	0	Phacoemulsification	2	0	1	1	1	14	0	0	0	0	0	0	1	10	10	7	6	3	2	1	0	Severe	1	0
103	pachubai	88343	Homaker	Female	63	0	0	RE	21	13	0	SICS	1	0	0	0	1	19	0	1	1	0	0	1	0	9	9	8	10	0	0	1	1	Severe	1	1
104	rudrayya b	65464	Farmer	Male	56	1	1	RE	20	13	0	SICS	1	0	0	0	1	10	0	1	1	0	1	1	0	9	10	10	8	3	3	1	0	Mild	0	0
105	ainuddin J	19487	Farmer	Male	47	0	1	RE	19	14	0	Phacoemulsification	2	1	1	1	1	18	0	0	0	1	0	1	0	10	9	9	6	0	0	1	0	Severe	0	0
106	sidappa b	74712	Teacher	Male	45	0	1	LE	19	14	0	Phacoemulsification	2	0	1	1	1	10	0	0	1	0	0	0	1	9	10	10	9	2	2	1	1	Moderate	0	0
107	rudrayya g	66484	Farmer	Male	68	1	1	LE	19	13	0	Phacoemulsification	2	0	1	1	0	17	0	0	0	1	0	0	0	10	9	5	9	1	1	0	1	Mild	1	0
108	sushila b	33029	Homaker	Female	71	0	0	RE	19	12	0	Phacoemulsification	2	1	1	1	0	18	0	0	0	0	1	0	1	10	10	9	7	2	2	0	1	Moderate	0	0
109	ningawwa H	80853	Homaker	Female	54	0	0	LE	20	11	0	SICS	1	0	0	0	0	18	0	1	0	1	1	0	0	9	10	7	7	3	1	0	1	Mild	0	0
110	surappa T	57942	Teacher	Male	45	0	0	LE	18	13	0	Phacoemulsification	2	0	0	0	0	10	0	0	1	1	0	0	0	10	9	5	6	1	1	0	0	Moderate	1	0
111	hemalabai R	89187	Homaker	Female	53	0	0	LE	18	12	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	1	0	0	1	5	10	10	7	3	3	0	1	Severe	1	0
112	bsanna H	91651	Retired	Male	74	0	0	LE	19	10	0	SICS	1	0	0	0	0	13	0	1	0	1	0	1	0	6	9	5	11	1	1	0	0	Moderate	1	0
113	layappa k	101074	Farmer	Male	51	1	1	RE	17	11	0	SICS	1	1	0	1	0	10	0	1	1	1	0	0	1	10	10	5	6	0	0	0	0	Severe	1	1
114	motihabai L	91644	Homaker	Female	65	0	0	RE	20	13	0	SICS	1	1	1	1	0	19	0	1	0	1	1	1	0	9	10	6	8	3	2	1	1	Moderate	0	0
115	gollalappa	64596	Retired	Male	73	1	1	LE	19	13	0	SICS	1	0	0	0	1	11	0	1	0	1	1	1	1	10	9	8	6	2	1	0	1	Moderate	1	0
116	kamalabai c	65450	Homaker	Female	68	0	0	LE	17	12	0	SICS	1	1	0	1	0	19	0	1	0	1	0	0	0	10	10	10	10	2	1	1	1	Mild	0	1
117	salabai b	165371	Homaker	Female	72	0	0	RE	18	12	0	Phacoemulsification	2	1	0	1	1	14	0	0	1	1	1	1	0	5	9	9	7	3	3	0	1	Mild	1	1
118	kalavati b	115865	Homaker	Female	48	0	0	RE	19	12	0	Phacoemulsification	2	0	0	0	0	17	0	0	1	0	0	0	0	10	10	8	10	3	2	1	1	Severe	1	1
119	boramma t	177709	Homaker	Female	45	0	0	LE	16	11	0	SICS	1	1	0	1	0	14	0	1	0	0	1	0	0	10	10	8	9	2	1	1	1	Mild	0	1
120	gourabai	182399	Homaker	Female	46	0	0	LE	17	12	0	Phacoemulsification	2	0	0	0	1	21	0	0	0	0	1	1	1	11	9	9	8	1	1	1	0	Mild	1	0
121	sambaji	91266	Farmer	Male	65	1	1	LE	18	12	0	SICS	1	1	0	1	1	15	0	1	0	0	0	0	0	10	10	6	11	2	1	0	1	Mild	1	0
122	basappa R	165408	Farmer	Male	61	1	1	RE	20	13	0	Phacoemulsification	2	1	1	1	0	16	0	0	1	0	1	1	0	10	9	10	7	3	3	0	0	Moderate	1	0

123	hameeda	173127	Homaker	Female	63	0	0	RE	17	12	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	1	0	0	0	10	10	9	9	2	2	0	1	Mild	1	1
124	satyawwa n	182042	Homaker	Female	59	0	0	RE	18	12	0	SICS	1	0	0	0	1	17	0	1	0	1	0	0	0	10	9	6	10	2	2	0	0	Mild	1	1
125	shantabai M	195181	Homaker	Female	63	0	0	LE	18	11	0	SICS	1	0	1	1	0	15	0	1	0	1	0	0	1	10	10	7	11	3	3	0	0	Severe	1	1
126	chandrashekhar	172805	Retired	Male	72	0	0	LE	20	13	0	Phacoemulsification	2	0	0	0	1	15	0	0	0	0	0	0	0	9	9	8	9	2	2	1	0	Mild	0	0
127	parayya r	185899	Homaker	Female	64	0	0	RE	19	13	0	SICS	1	1	0	1	1	17	0	1	0	0	1	0	1	10	10	8	7	0	0	0	0	Severe	1	0
128	shantavva m	157529	Homaker	Female	47	0	0	RE	18	12	0	SICS	1	1	1	1	1	10	0	1	0	0	1	1	1	10	9	7	10	4	4	1	1	Mild	0	0
129	shankarevva m	175173	Homaker	Female	70	0	0	RE	17	12	0	SICS	1	0	0	0	1	10	0	1	0	0	1	1	1	10	10	5	9	3	3	1	0	Severe	1	1
130	mallamma m	185410	Homaker	Female	59	0	0	LE	17	12	0	SICS	1	0	1	1	1	11	0	1	1	0	1	1	0	10	10	5	6	1	1	0	1	Mild	0	0
131	ansubai h	195809	Homaker	Female	74	0	0	RE	18	11	0	Phacoemulsification	2	0	0	0	1	16	0	0	0	0	1	0	1	9	9	5	6	1	1	1	0	Mild	0	1
132	ramappa m	234047	Farmer	Male	52	1	0	RE	19	13	0	Phacoemulsification	2	0	1	1	1	17	0	0	1	1	0	1	1	10	10	8	7	3	3	0	0	Mild	1	1
133	boramma s	243695	Homaker	Female	72	0	0	RE	19	14	0	Phacoemulsification	2	0	0	0	1	12	0	0	0	1	0	1	1	10	9	8	11	1	1	0	1	Moderate	1	1
134	sangappa s	241091	Retired	Male	70	0	1	LE	20	11	0	Phacoemulsification	2	0	1	1	1	14	0	0	1	0	0	1	0	9	10	9	6	1	1	0	0	Moderate	0	0
135	laxman b	241097	Farmer	Male	54	1	1	LE	20	11	0	Phacoemulsification	2	1	0	1	1	11	0	0	1	0	1	0	1	10	10	5	11	2	2	1	1	Severe	0	1
136	basappa T	165448	Retired	Male	70	0	0	RE	17	10	0	Phacoemulsification	2	0	1	1	1	10	0	0	0	0	1	1	1	5	8	10	11	4	4	1	1	Mild	0	1
137	basanna m	165289	Retired	Male	74	0	1	LE	19	13	0	SICS	1	0	0	0	0	16	0	1	0	0	0	1	1	6	10	5	6	4	4	1	0	Moderate	1	0
138	sidappa b	74716	Farmer	Male	62	1	1	LE	18	12	0	Phacoemulsification	2	1	0	0	1	14	0	0	1	1	1	0	0	10	10	5	6	4	4	1	1	Moderate	0	0
139	satevva	125105	Homaker	Female	45	0	0	RE	19	12	0	SICS	1	0	1	1	1	17	0	1	0	0	1	1	0	9	9	8	7	3	3	1	1	Moderate	0	1
140	chinavva k	146562	Homaker	Female	70	0	0	LE	19	10	0	Phacoemulsification	2	1	0	0	0	17	0	0	1	0	0	0	1	10	10	6	11	0	0	1	1	Severe	0	0
141	kasturi p	11906	Homaker	Female	67	0	0	LE	18	13	0	SICS	1	1	1	1	1	18	0	1	0	0	0	0	0	10	9	8	8	0	0	0	0	Severe	0	1
142	shetewwa p	105759	Homaker	Female	53	0	0	LE	17	12	0	Phacoemulsification	2	0	1	1	0	16	0	0	1	0	0	0	1	5	10	7	10	1	1	0	1	Moderate	1	0
143	bhimu	173254	Farmer	Male	68	1	1	RE	17	14	0	Phacoemulsification	2	0	0	0	0	15	0	0	0	1	0	0	0	10	9	9	7	4	4	1	1	Severe	1	1
144	gujavva	172675	Homaker	Female	61	0	0	RE	18	13	0	Phacoemulsification	2	0	1	1	1	10	0	0	1	1	0	0	0	10	10	6	10	3	3	0	1	Moderate	1	0
145	sidalingamma	180946	Homaker	Female	72	0	0	RE	18	12	0	SICS	1	0	0	0	0	12	0	1	1	1	0	1	0	11	9	5	11	0	0	1	0	Mild	0	0
146	basappa h	214677	Retired	Male	70	0	0	RE	19	14	0	Phacoemulsification	2	0	1	1	1	17	0	0	1	0	0	0	0	10	10	10	6	0	0	1	0	Mild	0	0
147	kasturibai	81487	Homaker	Female	61	0	0	RE	19	11	0	SICS	1	0	0	0	1	12	0	1	0	0	0	1	1	10	9	5	11	0	0	1	1	Severe	0	0
148	renuka b	180785	Homaker	Female	51	0	0	LE	18	13	0	Phacoemulsification	2	0	0	0	1	17	0	0	1	0	1	1	1	10	10	9	7	4	4	0	0	Mild	0	1
149	s nimbal	18358	Farmer	Male	57	1	1	RE	19	11	0	Phacoemulsification	2	0	1	1	0	10	0	0	0	1	0	0	1	10	10	7	6	3	3	1	0	Severe	0	1
150	chandawwa t	209639	Homaker	Female	71	0	0	LE	20	10	0	SICS	1	0	0	0	1	14	0	1	1	0	1	1	0	10	9	10	6	1	1	1	0	Mild	1	0
151	chankalamma h	12360	Homaker	Female	73	0	0	RE	19	13	0	Phacoemulsification	2	1	0	1	0	13	0	0	0	0	0	1	1	9	10	6	8	4	4	1	1	Severe	0	1
152	gourabai	182339	Homaker	Female	52	0	0	LE	20	11	0	Phacoemulsification	2	1	0	1	1	14	0	0	1	1	0	1	1	10	9	8	6	0	0	0	0	Mild	1	0
153	sharanappa	18491	Retired	Male	74	0	0	RE	20	12	0	SICS	1	0	0	0	1	17	0	1	0	1	1	1	0	10	10	9	6	4	4	0	0	Moderate	0	1
154	davalabi h	182650	Homaker	Female	74	0	0	RE	19	12	0	SICS	1	0	0	0	1	19	0	1	1	0	0	1	0	10	10	6	9	2	2	0	0	Mild	0	1

155	laxman g	291502	Homaker	Female	46	0	0	RE	18	11	0	SICS	1	0	1	1	0	13	0	1	1	0	0	1	1	9	10	9	10	4	4	1	1	Mild	0	0
156	sidavva m	254186	Homaker	Female	46	0	0	RE	19	11	0	SICS	1	0	1	1	1	16	0	1	1	0	1	0	1	10	9	5	11	1	1	1	0	Moderate	1	1
157	annapurna h	240829	Homaker	Female	68	0	0	LE	18	13	0	Phacoemulsification	2	1	0	0	1	13	0	0	0	1	0	1	1	10	9	9	7	3	3	0	0	Moderate	1	1
158	mahadevi b	257840	Homaker	Female	66	0	0	LE	17	12	0	SICS	1	0	0	0	0	12	0	1	0	0	0	1	0	10	9	8	11	1	1	0	1	Mild	1	0
159	mahadevappa h	182275	Teacher	Male	45	0	1	LE	19	13	0	SICS	1	1	1	1	1	16	0	1	1	1	0	0	1	9	9	7	9	2	2	1	1	Severe	1	0
160	nagappa k	139735	Farmer	Male	68	1	1	LE	17	12	0	Phacoemulsification	2	0	0	0	0	12	0	0	0	0	0	0	0	10	9	10	10	3	3	1	1	Severe	0	1
161	aminsab n	127787	Retired	Male	71	0	0	RE	19	10	0	Phacoemulsification	2	1	1	1	1	15	0	0	0	1	0	1	0	9	10	9	10	2	2	1	1	Mild	1	0
162	basappa	231566	Farmer	Male	57	1	1	LE	18	12	0	Phacoemulsification	2	1	1	1	0	12	0	0	1	1	0	0	0	10	9	9	10	3	3	1	0	Moderate	1	1
163	ambu shinde	189468	Homaker	Female	71	0	0	RE	17	13	0	SICS	1	0	0	0	0	15	0	1	1	0	1	1	0	6	10	6	9	0	0	1	1	Moderate	0	0
164	imamsab g	127269	Farmer	Male	59	1	1	LE	20	12	0	SICS	1	0	0	0	0	19	0	1	0	1	1	0	0	10	10	5	11	3	3	1	1	Mild	0	0
165	laxmibai b	188262	Homaker	Female	69	0	0	LE	16	12	0	Phacoemulsification	2	0	1	1	1	14	0	0	1	0	1	0	0	10	9	7	8	4	4	1	1	Moderate	0	0
166	basanna h	94165	Farmer	Male	58	1	1	RE	19	13	0	Phacoemulsification	2	0	0	0	0	14	0	0	1	1	1	0	1	10	10	6	7	3	3	1	1	Mild	1	1
167	kasturi m	186524	Homaker	Female	52	0	0	LE	17	12	0	Phacoemulsification	2	0	0	0	1	15	0	0	0	1	1	0	1	9	10	7	8	1	1	1	1	Moderate	1	0
168	pavadeppa p	64527	Farmer	Male	68	1	1	RE	19	11	0	SICS	1	0	1	1	0	17	0	1	1	0	0	1	0	10	9	9	8	3	3	1	0	Severe	0	1
169	mallappa t	33493	Retired	Male	70	0	0	LE	20	12	0	Phacoemulsification	2	0	0	0	0	19	0	0	0	1	1	1	1	10	10	8	7	0	0	0	0	Severe	1	1
170	neelawwa m	173633	Homaker	Female	59	0	0	LE	20	13	0	Phacoemulsification	2	0	0	0	1	15	0	0	0	1	1	1	0	10	10	9	7	3	3	0	0	Mild	1	1
171	basanna	176354	Farmer	Male	64	1	1	RE	19	12	0	Phacoemulsification	2	0	1	0	1	11	0	0	0	0	1	0	0	9	10	10	11	0	0	0	0	Moderate	0	0
172	gujavva h	162649	Homaker	Female	51	0	0	LE	18	11	0	Phacoemulsification	2	0	0	0	0	10	0	0	0	0	0	0	1	10	9	10	11	1	1	1	0	Severe	1	1
173	gourabai	80484	Homaker	Female	57	0	0	LE	19	13	0	Phacoemulsification	2	0	0	0	1	17	0	0	1	1	0	1	0	10	10	6	8	1	1	0	1	Severe	1	0
174	prakash h	33443	Farmer	Male	55	1	1	RE	17	14	0	Phacoemulsification	2	0	1	0	1	17	0	0	0	1	0	1	0	11	10	5	9	3	3	1	0	Severe	0	1
175	rukmavva k	169269	Homaker	Female	49	0	0	LE	18	12	0	SICS	1	1	0	0	1	18	0	1	0	0	1	0	0	10	9	9	8	4	4	1	0	Mild	1	0
176	yallavva k	169274	Homaker	Female	48	0	0	RE	18	13	0	Phacoemulsification	2	0	1	1	0	18	0	0	0	0	0	0	0	10	10	7	10	2	2	0	0	Mild	0	0
177	shetevva	106590	Homaker	Female	64	0	0	LE	19	12	0	Phacoemulsification	2	0	1	1	0	11	0	0	0	0	1	0	1	9	10	9	7	1	1	0	0	Severe	0	0
178	chinawwa	164652	Homaker	Female	53	0	0	LE	17	13	0	Phacoemulsification	2	0	0	0	1	11	0	0	0	0	0	1	0	10	10	9	8	1	1	1	1	Moderate	1	0
179	siddavva	146559	Homaker	Female	74	0	0	RE	17	12	0	SICS	1	0	0	1	0	12	0	1	0	0	0	1	0	8	10	8	8	0	0	1	1	Moderate	1	0
180	vittal	149523	Retired	Male	73	1	1	LE	20	14	0	Phacoemulsification	2	0	0	1	1	10	0	0	0	1	0	0	0	10	10	9	6	0	0	0	1	Moderate	1	1
181	somanna	3492	Farmer	Male	57	1	1	RE	17	14	0	SICS	1	0	0	1	1	13	0	1	1	0	0	0	1	6	9	6	9	0	0	1	1	Severe	1	0
182	dastagirsab k	46045	Retired	Male	71	0	1	LE	18	12	0	Phacoemulsification	2	0	0	0	1	13	0	0	0	1	0	1	0	9	9	9	9	3	3	0	0	Severe	0	0
183	gangayya v	31356	Retired	Male	74	0	0	LE	19	12	0	SICS	1	1	1	1	1	18	0	1	0	0	0	0	1	8	9	10	7	1	1	0	0	Severe	1	0
184	rudramma	162459	Homaker	Female	70	0	0	RE	18	12	0	Phacoemulsification	2	1	0	1	1	18	0	0	0	0	1	0	0	7	9	8	6	3	3	0	0	Severe	0	1
185	basamma y	160896	Homaker	Female	74	0	0	RE	17	12	0	Phacoemulsification	2	1	0	1	0	18	0	0	1	0	0	0	0	6	10	10	8	1	1	0	1	Severe	1	0
186	mallanna	130329	Teacher	Male	48	1	1	RE	17	14	0	SICS	1	0	1	1	1	19	0	1	0	0	0	0	0	10	10	5	9	4	4	0	1	Severe	1	0

187	kasturibai v	84187	Homaker	Female	73	0	0	LE	18	14	0	Phacoemulsification	2	0	0	0	0	16	0	0	0	1	1	0	0	13	10	6	11	2	2	1	0	Moderate	0	1
188	vimala m	91058	Homaker	Female	59	0	0	RE	19	12	0	SICS	1	0	1	1	0	11	0	1	0	1	1	1	0	12	9	7	7	0	0	0	1	Severe	1	1
189	prema	1089	Homaker	Female	65	0	0	LE	18	12	0	Phacoemulsification	2	0	0	0	1	19	0	0	1	1	1	1	0	6	10	5	8	1	1	1	0	Severe	1	1
190	hanamanth h	100995	Farmer	Male	61	1	0	LE	18	11	0	Phacoemulsification	2	0	0	0	1	14	0	0	0	1	0	1	1	13	10	8	10	2	2	1	0	Mild	1	0
191	malakappa g	1171	Farmer	Male	67	1	1	RE	19	13	0	SICS	1	0	1	1	1	13	0	1	1	1	1	1	0	9	9	8	11	4	4	0	1	Moderate	0	1
192	ramappa	115286	Farmer	Male	58	1	1	LE	17	11	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	0	1	0	1	8	10	9	6	4	4	1	1	Moderate	1	0
193	gambai r	117290	Homaker	Female	61	0	0	RE	17	10	0	SICS	1	1	1	1	0	15	0	1	0	1	0	1	0	11	9	8	8	0	0	1	1	Mild	1	0
194	sidalingamma	218717	Homaker	Female	46	0	0	LE	19	10	0	SICS	1	0	1	1	0	17	0	1	1	1	0	0	0	8	10	10	11	3	3	1	1	Mild	1	0
195	gurulingayya	181424	Farmer	Male	53	1	1	LE	17	11	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	0	0	1	0	8	9	9	10	2	2	0	1	Moderate	0	0
196	neelawwa	216854	Homaker	Female	53	0	0	RE	18	10	0	SICS	1	0	0	0	0	15	0	1	1	1	0	1	1	11	10	7	7	2	2	0	0	Mild	0	0
197	sushila t	154457	Homaker	Female	50	0	0	LE	19	11	0	SICS	1	0	0	0	0	14	0	1	1	0	1	0	0	13	9	7	6	1	1	1	1	Mild	1	1
198	kamalabai	204311	Homaker	Female	59	0	0	LE	17	14	0	Phacoemulsification	2	0	1	1	0	10	0	0	1	0	0	0	0	8	10	5	6	4	4	1	1	Severe	0	0
199	sidaraya s	189694	Retired	Male	72	0	0	RE	17	10	0	SICS	1	0	1	1	0	11	0	1	0	1	1	0	0	7	9	6	9	2	2	0	0	Severe	1	1
200	hanmanth j	167840	Farmer	Male	58	1	0	LE	19	13	0	SICS	1	1	1	1	0	10	0	1	1	0	0	0	0	7	10	10	11	3	3	1	1	Mild	0	0
201	sangappa b	163038	Farmer	Male	56	1	1	RE	18	10	0	SICS	1	1	0	1	0	19	0	1	0	0	0	0	0	13	10	6	6	1	1	1	1	Moderate	0	1
202	nagappa	139733	Farmer	Male	62	1	1	RE	17	12	0	SICS	1	1	0	1	0	10	0	1	1	1	0	1	0	13	9	5	9	0	0	0	1	Severe	1	1
203	bapuray	129563	Farmer	Male	59	1	0	LE	16	11	0	Phacoemulsification	2	1	1	1	0	17	0	0	1	1	0	1	0	13	10	8	9	1	1	0	1	Mild	0	0
204	marewwa h	201636	Homaker	Female	65	0	0	LE	16	11	0	SICS	1	0	0	0	1	11	0	1	1	0	1	0	0	9	9	10	8	1	1	0	1	Mild	0	0
205	bagamma	200630	Homaker	Female	60	0	0	LE	18	13	0	SICS	1	1	1	1	0	16	0	1	0	1	1	0	1	12	10	7	8	0	0	0	1	Mild	0	1
206	savitri	201039	Homaker	Female	55	0	0	RE	19	12	0	SICS	1	0	1	1	0	18	0	1	0	0	0	0	0	9	10	8	9	4	4	1	1	Moderate	1	0
207	ramazanbi	197740	Homaker	Female	56	0	0	RE	16	12	0	Phacoemulsification	2	0	0	0	1	18	0	0	0	0	0	1	0	10	10	5	11	1	1	1	0	Moderate	0	1
208	sidalingappa	200485	Retired	Male	72	0	1	LE	17	13	0	Phacoemulsification	2	0	1	1	0	17	0	0	1	1	0	0	0	9	9	5	8	2	2	0	1	Moderate	1	1
209	ramappa k	213005	Farmer	Male	47	0	0	RE	16	12	0	Phacoemulsification	2	0	1	1	1	10	0	0	0	1	1	0	1	13	9	10	7	4	4	0	0	Mild	0	0
210	sidaramappa	201100	Farmer	Male	52	1	1	LE	20	12	0	Phacoemulsification	2	0	0	0	1	11	0	0	0	0	0	0	0	11	9	6	8	2	2	0	0	Severe	1	0
211	kalavati h	192905	Homaker	Female	52	0	0	LE	17	13	0	SICS	1	0	1	1	0	19	0	1	1	1	0	0	0	7	9	7	6	2	2	1	1	Mild	0	0
212	sadashiv	189313	Farmer	Male	69	1	1	RE	16	12	0	Phacoemulsification	2	1	0	1	0	18	0	0	0	1	1	0	0	9	9	8	11	4	4	0	0	Moderate	1	0
213	sudhabai h	192093	Homaker	Female	61	0	0	RE	16	10	0	SICS	1	0	1	1	1	11	0	1	0	0	1	1	0	11	10	7	8	1	1	0	0	Moderate	0	1
214	lalsab	192683	Farmer	Male	67	1	1	LE	17	13	0	SICS	1	0	0	0	1	15	0	1	0	0	0	0	0	13	9	6	11	2	2	0	0	Moderate	0	0
215	sanganna	198522	Retired	Male	73	1	1	RE	19	12	0	Phacoemulsification	2	0	1	1	0	13	0	0	0	0	0	1	1	10	10	9	8	2	2	1	0	Severe	1	1
216	shantabai	191388	Homaker	Female	64	0	0	RE	19	13	0	Phacoemulsification	2	0	0	0	1	13	0	0	0	1	1	0	1	13	10	10	10	4	4	0	0	Mild	0	1
217	yallavva m	190246	Homaker	Female	49	0	0	LE	18	13	0	SICS	1	1	0	1	0	14	0	1	0	1	1	1	1	9	9	6	11	1	1	0	0	Severe	0	0
218	shantabai d	140350	Homaker	Female	73	0	0	RE	18	12	0	Phacoemulsification	2	0	1	1	1	16	0	0	0	1	0	1	0	6	10	10	9	0	0	0	1	Mild	0	1

219	rudrayya	156807	Retired	Male	72	0	1	LE	21	11	0	Phacoemulsification	2	1	0	1	0	12	0	0	0	1	1	0	0	11	10	7	10	2	2	0	0	Moderate	1	0
220	mahdevi g	152373	Homaker	Female	72	0	0	RE	18	11	0	Phacoemulsification	2	1	0	1	1	10	0	0	1	1	1	0	0	11	9	9	8	4	4	1	0	Severe	0	1
221	basamma b	178580	Homaker	Female	74	0	0	LE	20	12	0	Phacoemulsification	2	0	1	1	1	17	0	0	0	0	0	0	0	7	10	7	10	0	0	0	1	Mild	0	0
222	jakkanna	158624	Farmer	Male	64	1	0	RE	17	12	0	SICS	1	0	1	1	1	14	0	1	0	0	0	1	0	12	10	9	6	2	2	1	1	Mild	0	0
223	bhimanna h	156742	Farmer	Male	57	1	1	LE	19	10	0	SICS	1	1	0	1	1	12	0	1	1	0	0	0	1	11	10	9	6	3	3	1	0	Mild	0	1
224	kantabai	165243	Homaker	Female	56	0	0	RE	17	12	0	Phacoemulsification	2	1	1	1	0	19	0	0	0	0	1	1	0	11	9	9	9	2	2	1	0	Moderate	0	0
225	ramesh g	190546	Farmer	Male	50	0	0	LE	18	10	0	SICS	1	1	0	1	0	16	0	1	0	1	0	0	0	9	10	7	7	3	3	0	1	Mild	0	0
226	mallappa	156942	Farmer	Male	62	1	0	RE	16	12	0	SICS	1	1	0	1	0	16	0	1	1	1	1	1	0	9	10	5	11	3	3	1	1	Moderate	1	1
227	ramu	354921	Farmer	Male	61	1	1	LE	16	14	0	Phacoemulsification	2	0	0	0	0	10	0	0	1	0	1	1	0	11	9	9	9	3	3	1	0	Mild	1	0
228	suresh	198543	Farmer	Male	49	1	1	RE	19	12	0	SICS	1	0	1	1	1	11	0	1	1	0	0	1	0	8	10	10	8	1	1	1	0	Mild	1	0
229	gouramma	171627	Homaker	Female	55	0	0	LE	17	11	0	SICS	1	0	1	1	0	18	0	1	1	1	1	0	1	6	10	6	7	2	2	1	0	Mild	0	0
230	nilavva	137317	Homaker	Female	51	0	0	RE	18	10	0	SICS	1	1	1	1	0	11	0	1	1	0	1	0	0	10	10	6	10	3	3	1	1	Mild	1	1
231	rukmavva	169284	Homaker	Female	46	0	0	LE	18	10	0	Phacoemulsification	2	0	1	1	1	14	0	0	0	0	0	1	1	8	10	9	7	1	1	0	0	Severe	1	0
232	yallavva	169712	Homaker	Female	70	0	0	LE	19	11	0	SICS	1	0	0	0	1	14	0	1	1	0	0	0	1	10	10	10	6	3	3	1	0	Moderate	1	1
233	ramanna	158664	Farmer	Male	47	0	0	RE	17	14	0	Phacoemulsification	2	0	0	0	1	17	0	0	0	0	0	0	1	7	9	7	11	0	0	0	0	Mild	0	1
234	bhimangauda	351294	Farmer	Male	54	1	1	LE	17	15	0	Phacoemulsification	2	0	0	0	1	17	0	0	1	1	1	0	0	8	9	10	8	3	3	0	1	Mild	1	1
235	damu r	345698	Farmer	Male	55	1	1	RE	19	13	0	Phacoemulsification	2	0	0	0	0	16	0	0	0	0	1	0	0	13	9	6	11	1	1	1	0	Mild	0	0
236	chinawwa	146652	Homaker	Female	51	0	0	LE	17	13	0	SICS	1	1	0	1	0	16	0	1	0	0	0	0	0	9	9	9	10	0	0	1	1	Severe	1	1
237	basappa	346952	Farmer	Male	50	0	0	LE	16	12	0	Phacoemulsification	2	0	1	1	1	13	0	0	0	0	1	0	1	10	10	10	6	3	3	0	1	Severe	1	0
238	somaningappa	346755	Farmer	Male	50	0	1	RE	19	10	0	Phacoemulsification	2	1	0	1	1	12	0	0	1	1	0	0	0	6	10	7	11	0	0	1	0	Mild	1	0
239	shasappa	31271	Farmer	Male	54	1	1	LE	19	13	0	SICS	1	0	0	0	0	15	0	1	0	0	0	1	1	8	10	9	6	1	1	0	1	Severe	0	1
240	mallamma	31919	Homaker	Female	58	0	0	RE	17	10	0	SICS	1	0	0	0	1	15	0	1	1	0	0	1	0	10	10	10	8	0	0	1	0	Mild	1	1
241	shivaji	39411	Teacher	Male	45	0	0	LE	20	12	0	SICS	1	1	1	1	0	10	0	1	1	0	0	1	0	8	10	7	11	2	3	1	0	Mild	0	0
242	mallangaud	191664	Farmer	Male	56	1	1	LE	17	12	0	SICS	1	1	1	1	0	18	0	1	0	0	0	1	0	7	9	7	7	3	2	0	0	Severe	0	0
243	laxman t	139542	Farmer	Male	69	1	0	LE	19	11	0	SICS	1	0	0	0	1	15	0	1	1	0	0	0	0	11	10	10	7	0	0	1	1	Severe	0	0
244	kantabai	390751	Homaker	Female	74	0	0	LE	17	12	0	SICS	1	1	0	1	1	15	0	1	1	1	0	0	0	12	9	8	9	2	1	0	0	Severe	1	0
245	ambawwa	324091	Homaker	Female	62	0	0	LE	19	13	0	Phacoemulsification	2	0	1	1	1	11	0	0	1	0	1	0	1	9	10	10	9	2	0	0	0	Moderate	0	1
246	kasturi	359116	Homaker	Female	70	0	0	RE	19	13	0	Phacoemulsification	2	0	0	0	0	11	0	0	0	0	0	0	1	10	9	9	7	2	2	1	0	Mild	1	0
247	nagappa g	264991	Farmer	Male	59	1	1	RE	20	12	0	SICS	1	0	1	1	1	14	0	1	0	1	0	1	1	9	10	5	10	2	3	1	1	Moderate	0	1
248	dyamawwa	7462	Homaker	Female	70	0	0	LE	20	12	0	Phacoemulsification	2	0	1	1	0	13	0	0	0	0	0	0	1	10	9	10	11	2	2	0	1	Mild	1	0
249	chankallamma h	126300	Homaker	Female	66	0	0	LE	18	10	0	SICS	1	0	0	0	0	12	0	1	0	0	1	0	1	10	10	8	8	3	3	1	1	Moderate	1	0
250	sharanappa	368445	Farmer	Male	67	1	1	RE	16	11	0	SICS	1	0	0	0	1	11	0	1	1	0	0	0	0	9	9	6	11	2	1	0	0	Moderate	0	0

251	jagdish	100462	Farmer	Male	55	1	1	LE	18	12	0	Phacoemulsification	2	0	1	1	1	12	0	0	0	1	0	0	1	10	10	7	6	1	1	0	0	Severe	0	1
252	pavadeppa	6128	Farmer	Male	51	1	1	RE	20	13	0	Phacoemulsification	2	0	0	0	1	16	0	0	1	0	1	1	0	5	10	9	7	3	2	1	0	Moderate	0	1
253	renuka b	300166	Homaker	Female	64	0	0	RE	19	12	0	SICS	1	0	0	0	1	17	0	1	0	1	0	0	0	6	9	10	10	3	3	1	0	Moderate	0	1
254	shivappa	40384	Farmer	Male	46	0	0	RE	16	12	0	Phacoemulsification	2	1	1	1	1	16	0	0	0	1	0	1	1	10	10	7	6	3	3	0	1	Moderate	1	1
255	manohar	35412	Retired	Male	74	0	1	LE	18	10	0	SICS	1	0	1	0	1	15	0	1	1	0	1	0	0	9	9	8	7	3	3	1	1	Moderate	1	1
256	ambawwa	192455	Homaker	Female	49	0	0	LE	19	12	0	Phacoemulsification	2	0	1	1	0	16	0	0	1	1	0	0	0	10	10	9	10	1	1	1	0	Mild	0	0
257	dawalbi	182644	Homaker	Female	69	0	0	LE	17	13	0	Phacoemulsification	2	1	1	1	0	14	0	0	0	0	0	1	0	10	10	9	8	3	3	0	0	Moderate	1	1
258	ravutappa	40593	Retired	Male	74	0	0	RE	17	12	0	Phacoemulsification	2	0	0	0	0	10	0	0	0	0	0	0	0	5	10	5	9	1	1	0	0	Moderate	1	0
259	shankar m	40651	Farmer	Male	56	1	1	LE	17	13	0	SICS	1	0	0	0	0	17	0	1	0	1	0	1	1	10	9	6	8	2	2	1	1	Severe	1	1
260	dastagirsab	140594	Farmer	Male	68	1	1	LE	16	12	0	SICS	1	0	1	0	1	12	0	1	0	1	0	1	0	10	9	8	6	3	1	0	1	Moderate	1	1
261	ningayya	142622	Teacher	Male	48	1	0	LE	18	12	0	Phacoemulsification	2	0	0	0	0	15	0	0	0	1	0	1	0	11	9	6	9	2	2	1	0	Mild	1	1
262	satalingappa n	40637	Teacher	Male	45	0	0	RE	16	13	0	SICS	1	1	0	0	0	12	0	1	0	0	0	1	0	10	9	8	7	0	0	0	0	Moderate	0	1
263	kambar g	40621	Farmer	Male	59	1	0	LE	17	10	0	Phacoemulsification	2	1	1	1	0	16	0	0	0	0	0	0	0	10	9	10	7	1	1	1	0	Moderate	0	0
264	muktabai	40718	Homaker	Female	51	0	0	RE	19	11	0	SICS	1	0	0	0	1	16	0	1	1	1	1	1	1	10	10	5	6	3	3	0	1	Moderate	0	0
265	ranawwa	38264	Homaker	Female	72	0	0	LE	20	14	0	SICS	1	1	0	0	0	11	0	1	0	0	0	0	0	10	9	6	7	2	0	0	1	Moderate	1	0
266	ningappa	41657	Farmer	Male	68	1	1	RE	19	12	0	SICS	1	1	0	1	1	18	0	1	0	0	0	1	0	10	10	5	10	3	3	0	0	Moderate	0	0
267	rasulbi	40585	Homaker	Female	56	0	0	LE	18	14	0	Phacoemulsification	2	0	0	0	0	14	0	0	0	0	1	1	1	9	10	8	10	2	2	0	1	Severe	0	0
268	jagadish h	45332	Farmer	Male	54	1	1	LE	18	15	0	Phacoemulsification	2	1	0	1	0	17	0	0	1	0	1	1	1	10	9	6	10	2	1	1	0	Severe	0	1
269	rukmakka	11509	Homaker	Female	53	0	0	LE	19	14	0	Phacoemulsification	2	0	0	0	1	19	0	0	1	1	0	1	1	10	10	7	7	3	2	0	0	Mild	0	1
270	adambu n	114182	Homaker	Female	71	0	0	RE	18	11	0	SICS	1	1	0	0	1	19	0	1	0	0	1	0	1	10	10	5	7	2	2	0	1	Moderate	0	1
271	shantawwa	114196	Homaker	Female	69	0	0	RE	17	12	0	SICS	1	1	1	0	0	17	0	1	1	1	0	1	0	9	9	6	6	2	1	0	1	Moderate	0	0
272	rukmabai	122935	Homaker	Female	67	0	0	RE	18	13	0	SICS	1	0	1	0	1	10	0	1	0	0	0	1	0	10	10	7	6	1	1	1	0	Moderate	0	1
273	gangabai k	125884	Homaker	Female	71	0	0	RE	19	12	0	SICS	1	0	0	0	1	11	0	1	0	1	1	1	0	10	10	10	8	3	1	1	0	Severe	0	1
274	sarojani	126445	Homaker	Female	51	0	0	RE	20	15	0	Phacoemulsification	2	0	1	1	0	14	0	0	0	0	0	1	1	10	10	5	10	0	0	0	1	Severe	1	0
275	sidamma	165222	Homaker	Female	46	0	0	LE	19	12	0	SICS	1	0	0	0	1	12	0	1	0	0	0	0	0	9	9	7	8	0	0	0	0	Moderate	1	0
276	laxmi	145529	Homaker	Female	60	0	0	RE	20	15	0	SICS	1	1	0	1	1	10	0	1	1	0	0	0	0	10	10	6	7	2	2	1	1	Moderate	0	1
277	janaki	2548	Homaker	Female	63	0	0	LE	17	14	0	Phacoemulsification	2	1	1	1	1	13	0	0	1	0	0	0	0	9	10	8	10	2	1	0	1	Moderate	1	0
278	jannatbi	2398	Homaker	Female	52	0	0	RE	19	11	0	Phacoemulsification	2	0	0	0	1	17	0	0	0	0	0	1	0	10	9	7	8	3	2	0	0	Mild	0	0
279	bhimakka	2395	Homaker	Female	45	0	0	LE	17	10	0	Phacoemulsification	2	0	1	1	1	12	0	0	1	1	1	0	0	6	10	6	9	2	1	0	1	Mild	1	1
280	davalsab n	155288	Farmer	Male	46	0	0	RE	19	10	0	Phacoemulsification	2	0	0	0	1	19	0	0	0	1	0	0	1	10	10	10	7	3	2	0	1	Severe	0	1
281	rudrawwa	200889	Homaker	Female	57	0	0	RE	21	10	0	Phacoemulsification	2	0	1	1	1	11	0	0	0	0	1	0	0	10	10	6	11	2	2	1	0	Moderate	1	1
282	husanavva	20737	Homaker	Female	67	0	0	RE	20	11	0	SICS	1	0	0	0	1	10	0	1	0	0	0	1	1	10	10	7	11	1	0	0	0	Moderate	0	1

283	laxmibai	2468	Homaker	Female	60	0	0	RE	18	12	0	Phacoemulsification	2	0	1	0	1	18	0	0	0	0	1	0	1	9	10	8	6	3	0	0	0	Moderate	1	0
284	dundawwa	220738	Homaker	Female	65	0	0	LE	19	11	0	Phacoemulsification	2	1	0	0	1	19	0	0	0	0	1	0	0	10	9	7	10	3	3	0	0	Mild	0	1
285	neelabai	220768	Homaker	Female	57	0	0	LE	19	11	0	Phacoemulsification	2	0	1	0	1	14	0	0	0	1	1	0	0	10	9	6	6	3	3	0	1	Moderate	1	1
286	shirayya	168422	Farmer	Male	53	1	1	LE	16	10	0	SICS	1	0	0	0	0	16	0	1	0	1	0	0	0	10	10	9	8	3	3	1	0	Mild	1	1
287	somaningappa	164400	Farmer	Male	59	1	1	RE	19	10	0	SICS	1	1	0	0	1	10	0	1	0	0	0	0	0	9	10	8	11	1	1	0	0	Mild	1	1
288	dugeppa	200641	Farmer	Male	69	1	1	RE	19	11	0	SICS	1	0	1	0	1	14	0	1	1	0	0	0	1	8	9	6	11	0	0	1	1	Severe	1	0
289	somaray	316549	Farmer	Male	64	1	1	RE	17	11	0	Phacoemulsification	2	1	0	0	0	11	0	0	0	0	1	0	0	9	10	5	11	0	0	0	1	Mild	1	0
290	ratnabi	221402	Homaker	Female	63	0	0	RE	17	10	0	SICS	1	1	1	0	1	18	0	1	1	1	1	1	0	11	9	10	10	4	4	0	1	Mild	0	1
291	kasturi s	221267	Homaker	Female	59	0	0	LE	18	14	0	SICS	1	0	1	0	0	18	0	1	0	0	0	1	0	8	10	6	11	1	1	1	0	Severe	1	0
292	madan	2401	Teacher	Male	48	1	1	RE	21	11	0	Phacoemulsification	2	0	0	0	0	13	0	0	1	1	0	0	1	9	9	6	6	3	3	1	1	Moderate	1	0
293	shantabai b	122264	Homaker	Female	73	0	0	RE	19	12	0	Phacoemulsification	2	0	1	0	1	13	0	0	1	1	0	1	1	9	10	5	6	1	1	0	1	Moderate	0	1
294	venkangouda g	2395	Farmer	Male	61	1	1	LE	16	11	0	Phacoemulsification	2	0	0	0	0	15	0	0	1	0	1	0	1	10	9	5	11	1	1	0	1	Severe	1	1
295	annappa	3739	Farmer	Male	66	1	1	LE	17	10	0	Phacoemulsification	2	0	1	0	1	19	0	0	0	1	0	1	1	9	10	10	9	3	4	0	1	Moderate	1	1
296	dundappa m	231331	Farmer	Male	64	1	1	LE	20	14	0	SICS	1	0	0	0	1	19	0	1	1	0	1	1	0	10	9	9	10	1	1	0	1	Moderate	1	1
297	ameensab	456222	Homaker	Female	70	0	0	LE	19	10	0	SICS	1	0	0	0	1	19	0	1	0	1	1	0	1	6	10	5	7	2	2	1	1	Mild	1	0
298	nilakanthray	203550	Farmer	Male	53	1	1	RE	16	11	0	Phacoemulsification	2	0	1	0	0	15	0	0	0	0	0	0	0	9	10	7	9	3	3	1	0	Severe	0	0
299	shankarewwa	3622	Homaker	Female	55	0	0	RE	19	10	0	Phacoemulsification	2	0	0	0	0	11	0	0	0	0	0	0	1	10	9	6	9	0	0	0	0	Severe	0	1
300	parvatibai	2688	Homaker	Female	46	0	0	RE	16	10	0	SICS	1	0	0	0	0	10	0	1	0	1	0	0	1	7	10	8	6	2	1	1	0	Mild	0	0
301	basavraj	2033491	Farmer	Male	61	1	1	RE	19	13	0	SICS	1	0	0	0	0	18	0	1	0	1	0	1	0	10	9	10	9	0	0	1	0	Moderate	1	0
302	lalitabai	344100	Homaker	Female	56	0	0	LE	20	11	0	SICS	1	0	0	0	0	11	0	1	1	1	0	0	1	9	10	7	8	3	2	1	0	Moderate	0	1
303	kasturi	21100	Homaker	Female	52	0	0	LE	18	15	0	Phacoemulsification	2	0	0	0	1	14	0	0	1	0	0	0	1	9	10	5	7	3	3	1	1	Severe	0	0
304	ranawwa	195233	Homaker	Female	68	0	0	RE	18	15	0	Phacoemulsification	2	0	0	0	0	18	0	0	0	1	1	0	0	6	10	6	7	3	1	0	0	Mild	0	1
305	lalbi	2164	Homaker	Female	64	0	0	RE	18	11	0	Phacoemulsification	2	1	0	0	1	13	0	0	1	0	0	0	1	8	9	9	8	1	1	0	0	Moderate	0	1
306	pireppa	312262	Farmer	Male	51	1	1	RE	19	11	0	Phacoemulsification	2	1	1	0	0	18	0	0	0	1	0	0	0	9	9	5	8	2	1	0	1	Severe	0	1
307	rasulbee	6823	Homaker	Female	47	0	0	LE	17	13	0	Phacoemulsification	2	0	0	0	0	12	0	0	1	0	1	0	0	7	9	9	8	3	3	0	0	Moderate	0	1
308	basappa	366484	Farmer	Male	56	1	1	LE	21	11	0	SICS	1	0	1	0	1	16	0	1	0	1	1	1	0	10	9	7	8	0	0	0	1	Moderate	1	0
309	bhimappa n	372024	Farmer	Male	59	1	1	LE	21	13	0	SICS	1	1	1	0	1	15	0	1	0	1	0	0	0	9	9	7	8	3	3	0	0	Severe	0	0
310	malakappa n	372482	Retired	Male	72	0	0	RE	19	14	0	Phacoemulsification	2	0	0	0	0	17	0	0	1	1	0	0	1	10	10	5	7	2	0	0	0	Moderate	1	0
311	imambi	372006	Homaker	Female	69	0	0	RE	20	12	0	SICS	1	0	0	0	1	12	0	1	1	0	0	1	1	7	9	5	11	1	1	1	0	Moderate	1	1
312	shevu	372442	Retired	Male	70	0	0	RE	16	10	0	Phacoemulsification	2	0	0	0	1	14	0	0	1	0	1	0	1	9	10	5	6	2	2	0	1	Mild	1	0
313	amogappa h	372489	Retired	Male	71	0	0	LE	20	9	0	SICS	1	0	0	0	0	19	0	1	1	1	1	1	0	8	10	9	10	2	1	0	0	Severe	0	1
314	meerabai	191722	Homaker	Female	65	0	0	LE	18	10	0	SICS	1	1	1	0	1	13	0	1	1	0	1	1	1	9	9	10	8	3	3	1	1	Severe	1	1

315	malakavva	349	Homaker	Female	74	0	0	LE	17	12	0	Phacoemulsification	2	1	0	0	1	13	0	0	1	1	0	0	0	10	10	6	6	3	1	0	0	Moderate	0	0
316	valabai	372033	Homaker	Female	69	0	0	LE	20	11	0	SICS	1	0	0	0	1	13	0	1	1	0	1	0	1	10	10	8	10	3	2	1	1	Mild	0	0
317	basavraj h	366761	Farmer	Male	54	1	1	RE	19	11	0	Phacoemulsification	2	0	0	0	0	19	0	0	1	0	0	0	0	9	9	7	9	2	2	0	1	Moderate	0	0
318	hajisab	366755	Farmer	Male	65	1	1	RE	21	10	0	Phacoemulsification	2	0	0	0	1	17	0	0	0	1	0	0	0	9	10	7	6	1	0	0	0	Moderate	1	0
319	renukabai	300477	Homaker	Female	71	0	0	LE	22	10	0	SICS	1	0	1	0	0	15	0	1	1	1	0	0	1	7	10	10	8	3	2	0	0	Moderate	1	0
320	sidappa	366747	Farmer	Male	67	1	0	RE	19	10	0	SICS	1	0	0	0	0	12	0	1	0	0	0	0	0	10	10	6	6	2	2	1	1	Severe	0	0
321	nirmala	371318	Homaker	Female	71	0	0	RE	18	13	0	SICS	1	0	0	0	0	19	0	1	1	0	0	0	0	9	9	8	11	3	2	1	0	Moderate	0	0
322	bhimanna v	366739	Farmer	Male	63	1	0	LE	16	10	0	SICS	1	1	1	0	0	14	0	1	1	0	1	0	0	9	10	6	7	3	3	0	0	Moderate	1	1
323	mallikarjun	366774	Farmer	Male	67	1	1	LE	16	10	0	Phacoemulsification	2	0	1	0	1	15	0	0	1	1	1	1	0	10	10	9	9	3	2	1	1	Moderate	0	1
324	basavva	371540	Homaker	Female	66	0	0	RE	19	11	0	Phacoemulsification	2	0	0	0	1	14	0	0	1	0	0	0	0	8	9	8	8	1	0	0	0	Severe	0	0
325	sugalabai	366736	Homaker	Female	60	0	0	RE	19	10	0	Phacoemulsification	2	1	0	0	1	15	0	0	1	1	0	0	0	6	10	7	11	3	2	1	0	Severe	0	1
326	saidalli	351408	Farmer	Male	51	1	1	LE	19	13	0	Phacoemulsification	2	1	0	0	0	17	0	0	0	1	0	0	0	10	10	5	9	1	1	0	0	Severe	0	1
327	yamanabai	366792	Homaker	Female	45	0	0	LE	16	13	0	SICS	1	0	0	0	0	16	0	1	1	0	0	1	0	7	10	10	9	2	1	1	0	Mild	0	0
328	mallamma	310286	Homaker	Female	53	0	0	LE	15	11	0	Phacoemulsification	2	0	0	0	0	14	0	0	0	1	0	0	1	6	10	7	11	2	2	0	1	Severe	1	1
329	sugalabai h	366474	Homaker	Female	46	0	0	RE	16	13	0	Phacoemulsification	2	0	0	0	1	19	0	0	0	0	1	1	0	10	10	10	6	2	1	1	1	Severe	1	0
330	gurubasavva	366783	Homaker	Female	48	0	0	RE	18	10	0	SICS	1	0	0	0	0	15	0	1	0	0	0	0	1	10	9	7	11	1	1	0	0	Moderate	1	0
331	kadubayi	309608	Homaker	Female	45	0	0	RE	19	10	0	SICS	1	0	0	0	1	13	0	1	0	1	0	1	1	8	9	5	6	3	2	0	0	Severe	1	0
332	sundarabai t	363911	Homaker	Female	57	0	0	RE	20	13	0	SICS	1	1	1	0	1	11	0	1	0	0	0	0	0	9	9	7	7	2	2	1	0	Mild	1	1
333	manappa c	364333	Farmer	Male	69	1	1	RE	20	12	0	SICS	1	0	0	0	0	18	0	1	1	0	1	0	1	6	9	10	7	2	2	0	0	Moderate	1	0
334	girimallappa	329174	Farmer	Male	69	1	1	LE	17	11	0	Phacoemulsification	2	0	0	0	1	13	0	0	0	0	1	0	1	10	10	6	10	1	0	1	1	Severe	0	0
335	sidappa	341266	Farmer	Male	66	1	1	RE	16	13	0	Phacoemulsification	2	0	0	0	0	10	0	0	0	0	1	0	1	6	10	7	6	3	2	1	1	Mild	0	1
336	shambai	364337	Homaker	Female	54	0	0	RE	19	12	0	Phacoemulsification	2	0	1	0	1	16	0	0	0	0	1	0	0	10	10	6	8	2	2	0	0	Severe	1	0
337	mumtaj	246949	Homaker	Female	46	0	0	LE	18	15	0	SICS	1	1	0	0	1	16	0	1	0	1	0	0	0	7	8	9	7	3	1	0	1	Moderate	1	0
338	sumangala	350074	Homaker	Female	52	0	0	LE	17	11	0	Phacoemulsification	2	1	0	0	0	13	0	0	1	1	0	1	1	8	8	7	9	1	1	1	1	Mild	0	1
339	mahadev	351401	Farmer	Male	47	0	0	RE	16	10	0	Phacoemulsification	2	0	1	0	0	12	0	0	0	1	1	1	1	9	7	9	7	2	2	1	1	Severe	0	0
340	shankerayya	345868	Teacher	Male	48	0	0	16	10	0	0	SICS	1	1	0	1	17	0	1	0	0	0	0	1	1	9	6	10	2	1	0	0	0	Mild	0	0