

EVALUATING HOW PRE EXISTING OCULAR CONDITIONS LIMIT VISUAL GAINS IN POST CATARACT SURGERY AT SEKURU KAGUVI EYE HOSPITAL

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Abstract

BACKGROUND: Cataract surgery is one of the common and effective ways to restore vision, but other systemic or ocular conditions can affect the outcome.

GOAL: To find out how comorbidities affect the results of cataract surgery on vision.

METHODS: A thorough review of the literature was done to look into the link between comorbidities such as diabetes mellitus, hypertension, age-related macular degeneration (AMD), glaucoma, and visual acuity after cataract surgery.

RESULTS: The study found that systemic comorbidities like diabetes and high blood pressure can make visual acuity worse because they affect retinal microcirculation and cause more inflammation. AMD and glaucoma are two ocular comorbidities that have a big effect on visual recovery. AMD affects the macula, and glaucoma can damage the optic nerve in a way that can't be fixed. Most of the patients with comorbidities had some kind of vision problem, and diabetic retinopathy, macular edema, and glaucoma were common problems.

CONCLUSION: Systemic comorbidities significantly determine on how well some patient's visual acuity can be affected after cataract surgery. To improve patient care and make the best use of surgical techniques, it is important to understand how comorbidities affect visual outcomes. To lessen the negative effects of comorbidities on visual acuity outcomes, treatment plans should be tailored to each person and close monitoring should be done after surgery.

KEYWORDS: Diabetes, Hypertension, AMD, Glaucoma, Cataract surgery, Visual acuity outcomes, and Comorbidities.

Declaration

Student

I PROMISE MUSANDIVENGA hereby affirm that, except for my supervisor's guidance, this study is a piece of my work submitted in partial fulfillment of the requirements for the Bachelor of Science Honor's Degree in Optometry at the Bindura University of Science Education. Harvard referencing style was employed to acknowledge other people's ideas.

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Supervisor's declaration

I **Dr Mtuwa** hereby affirm that this study was conducted under my supervision and have been approved for submission in partial fulfillment of the requirements for the Bachelor of Science Honor's Degree in Optometry at the Bindura University of Science Education.

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SUPERVISOR'S NAME: Dr C.N. Mtuwa

Dedication

This project is dedicated to dear brother Prosper Musandivenga, my human diary (Moreblessing Buruwuru) and my lovely mother Rebecca Kunyadza for their constant love, support and encouragement throughout this journey. I am also incredibly appreciative of Dr. C.N Mtuwa, and Mrs. Koomson whose counsel, insight and spiritual support gave me courage and inspiration just when I was about to put off finishing my education.

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List of Abbreviations

AI – Artificial Intelligence

AMD- Age- Related Macular Degeneration

BUSE- Bindura University of Science Education

CME-Cystoid Macular Edema

DR- Diabetic Retinopathy

DM- Diabetes Mellitus

OCT- Optical Coherence Tomography

IOP- Intra Ocular Pressure

UV- Ultraviolet

VA- Visual Acuity

VEGF- Vascular Endothelial Growth Factors

WHO-World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background of Study

Cataract surgery is one of the commonly performed ophthalmic procedures worldwide and remains a major intervention for restoring sight and improving quality of life among people with lens opacity. Modern cataract extraction with intraocular lens implantation has generally produced good postoperative outcomes, yet visual recovery has not been uniform across patients who have undergone this procedure. (Zhang et al. 2020) argue that the success of cataract surgery is influenced not only by the surgical procedure itself, but also by the patient's pre-existing systemic and ocular conditions. This means that postoperative visual acuity should not be understood as a purely surgical outcome, because it is also shaped by broader clinical factors that may limit recovery, prolong rehabilitation, and reduce patient satisfaction.

Systemic comorbidities are particularly important in cataract care because they are common among older adults, who form the largest proportion of cataract patients. Diabetes mellitus, hypertension, and cardiovascular disorders frequently coexist with cataract and may alter the eye's ability to recover fully after surgery. (Zhang et al.2020) highlight that diabetes is associated with diabetic retinopathy and macular oedema, both of which may compromise postoperative visual improvement. (Lee et al. 2021) further suggest that hypertension may impair retinal microcirculation and thereby slow visual rehabilitation. (Patel et al. 2019) also indicate that cardiovascular disease may complicate perioperative stability and recovery, even where direct ocular damage is not obvious. These conditions therefore matter not only because they are prevalent, but because they may influence both surgical outcome and postoperative care requirements.

Ocular comorbidities present an even more direct challenge because they affect structures that are essential for vision. Glaucoma, age-related macular degeneration, and uveitis may all reduce the degree of visual improvement that can be achieved after cataract removal. (Garcia-Martin et al. 2022) show that glaucoma may limit postoperative gain because optic nerve damage is irreversible. Wu et al. (2022) similarly note that age-related macular degeneration may restrict central visual recovery due to existing macular damage. (Sharma et al. 2023) add that uveitis increases the risk of postoperative inflammation and related complications, making surgical planning and follow-up more complexes. The presence of these ocular

conditions therefore shifts cataract surgery from a routine restorative procedure to a more carefully managed intervention with variable visual expectations.

For this reason, the study of comorbidities in cataract surgery must extend beyond whether vision improves after the operation. It must also consider how comorbidities influence preoperative assessment, perioperative decision-making, postoperative monitoring, and the selection of strategies that can optimise recovery in affected patients. (Kumar and Singh 2020) emphasise that a broader clinical perspective is necessary if practitioners are to counsel patients appropriately, anticipate risks, and tailor management to individual needs. This study was therefore designed to examine the impact of both systemic and ocular comorbidities on visual acuity outcomes after cataract surgery, while also considering the management issues associated with these patients and the strategies that may improve postoperative results.

1.2 Problem Statement

Cataract surgery constitutes an age-old technique for restoring eyesight; however, final visual results might sometimes end up affected by systemic and ocular comorbidities. Systemic comorbidities such as diabetes mellitus, hypertension, and cardiovascular disorders stand as well alongside ocular conditions such as glaucoma, AMD, and uveitis among patients undergoing cataract surgery. They adversely affect their visual outcome, with some studies showing that the existence of these comorbidities' delays recovery periods, lessens the degree of visual improvement, and adds to the complexity of postoperative care (Zhang et al. 2020; Lee et al. 2021; Garcia Martin et al. 2018). Despite lagging in surgical procedure and types of intraocular lenses, those who have comorbidities yet get a worse visual outcome, subsequent disappointed expectations, and less enjoyment of life. Therefore, the surgeon has a very tough task in managing these patients both perioperatively in terms of the associated risk and intraoperative in terms of modifying surgical techniques; however, almost no research has been carried out to attempt to quantify how much these comorbidities affect the outcomes of visual acuity and what must be done in order to improve post-operative care.

This void would require an in-depth appraisal of how systemic and ocular comorbidities affect visual outcomes; the hurdles posed on intraoperative and postoperative management of these patients as well as the possible avenues to whom the care of this patient population could be assigned. As a result, the outcome in the management of cataract would improve along with patient satisfaction.

1.2 Research Objectives

1. To assess the impact of systemic comorbidities on visual acuity outcomes post-cataract surgery.
2. To examine the influence of ocular comorbidities on postoperative visual acuity following cataract surgery.
3. To discover issues associated with managing patients with comorbidities following cataract surgery.
4. To research ways for optimizing visual acuity outcomes in patients with comorbidities following cataract surgery

1.3 Research Questions

1. What is the impact of systemic comorbidities, such as diabetes mellitus, hypertension, cardiovascular disorders, on visual acuity outcomes following cataract surgery?
2. How do ocular comorbidities, including glaucoma, age-related macular degeneration (AMD), and uveitis affect postoperative visual acuity after cataract surgery?
3. What obstacles are related to the management of patients with systematic and ocular comorbidities during cataract surgery and the techniques that can be implemented to maximize the visual acuity outcomes in individuals with comorbidities having surgery?

CHAPTER 2: **LITERATURE REVIEW**

2.1 Introduction

This chapter reviews the literature on the impact of comorbidities on visual acuity following cataract surgery. Although cataract surgery is widely recognised as an effective intervention for restoring sight and improving quality of life, postoperative visual outcomes are not always uniform across patients. In many cases, the degree of visual recovery is influenced not only by the surgical procedure itself, but also by the presence of systemic and ocular comorbidities that may affect healing, retinal function, optic nerve integrity, and the overall rehabilitation process. Understanding this relationship is important because it shapes both surgical expectations and postoperative care.

The literature reviewed in this chapter focuses on major comorbidities relevant to this study, namely diabetes mellitus, hypertension, age-related macular degeneration, glaucoma, and selected additional systemic conditions. These comorbidities are particularly important in cataract populations because they commonly occur among older adults, who constitute the group most frequently affected by cataract. Existing literature suggests that such conditions may reduce postoperative visual improvement, delay recovery, or complicate perioperative and postoperative management, thereby influencing final visual acuity outcomes and patient satisfaction.

To ensure logical progression, the chapter is organised in a structured sequence. It begins with a brief empirical overview of the broader literature on cataract surgery outcomes and comorbidities. It then proceeds to the theoretical framework, which provides the lens through which the relationship between comorbidities and postoperative visual acuity is interpreted. Thereafter, the review examines the major comorbidities individually, with each subsection focusing on three core issues: the effect of the condition on postoperative visual acuity, the mechanisms through which the condition may influence surgical outcomes, and the clinical implications for patient care. The chapter then considers management issues across the cataract surgery pathway and briefly reflects on contextual barriers that may influence outcomes in low-resource settings. It concludes by identifying the research gaps that justify the present study.

This structure is intended to move the discussion from general understanding to focused analysis. Rather than treating cataract surgery outcomes as a purely technical matter, the chapter recognises that postoperative visual acuity is shaped by a combination of biological,

clinical, and contextual factors. In this way, the review provides the conceptual and empirical foundation for examining how comorbidities influence visual acuity after cataract surgery in Harare.

2.2 Empirical Overview of Studies on Comorbidities and Post-Cataract Visual Outcomes

Empirical literature on cataract surgery has consistently shown that good surgical technique alone does not guarantee optimal postoperative visual acuity. A growing body of research suggests that the presence of comorbidities may alter both the extent and the speed of visual recovery after surgery. Rather than functioning as isolated background conditions, systemic and ocular comorbidities often shape preoperative status, influence intraoperative risk, and affect the quality of postoperative rehabilitation. As a result, the literature increasingly treats visual outcome after cataract surgery as a product of both surgical intervention and patient-related clinical factors.

Several studies have shown that patients with comorbidities are less likely to achieve optimal postoperative visual improvement than those without such conditions. (Sa'at et al. 2022) found that multiple patient-related factors, including the presence of comorbid illness, were associated with poorer visual improvement after phacoemulsification among Malaysian cataract patients. In a related way, (Kwedar et al. 2022) observed that patients with pre-existing health conditions demonstrated variable recovery patterns after cataract surgery, suggesting that comorbidities influence not only the final visual result but also the trajectory of recovery. These findings indicate that postoperative visual acuity should be understood as a dynamic outcome that may be modified by underlying disease burden.

The literature also shows that the effect of comorbidities is not uniform, because different conditions influence visual recovery through different pathways. Some studies emphasise systemic disorders such as diabetes and hypertension, which may compromise retinal perfusion, inflammatory control, or metabolic stability. Others focus on ocular disorders, where pre-existing structural damage may directly limit the visual gain achievable after cataract removal. (Tan et al. 2022) further demonstrate that postoperative outcomes should not be assessed solely through measured visual acuity, as preoperative health status also affects patients' visual functioning and perceived quality of life after surgery. This broadens the understanding of outcome beyond clinical measurement alone.

The empirical literature suggests three important patterns. First, comorbidities are consistently associated with poorer or slower postoperative visual recovery. Second, the influence of comorbidities differs according to the type and severity of the condition involved. Third, the management of patients with comorbidities requires more than routine cataract care, because preoperative assessment, risk reduction, and postoperative monitoring become more important in such cases. However, the existing literature is not always balanced, as some comorbidities, particularly diabetes, are more extensively studied than others. This makes it necessary to review the major comorbidities systematically and comparatively. The following sections therefore examine diabetes, hypertension, age-related macular degeneration, glaucoma, and other selected comorbidities in relation to postoperative visual acuity outcomes.

Critical Analysis

2.2.1.1 Diabetes

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyper-glycaemia and is one of the most important systemic comorbidities in patients undergoing cataract surgery. Its importance in this study lies in the fact that diabetes affects not only the development of cataract, but also the quality of visual recovery after surgery. (Kwon et al. 2015) argue that diabetes may negatively influence postoperative visual acuity, particularly where retinal complications are already present. Similarly, (Lee et al. 2022) report that patients with diabetes often experience poorer visual outcomes after cataract surgery than non-diabetic patients. This suggests that diabetes should not be treated as a background medical condition only, but as a clinically significant factor that may shape final visual acuity.

The effect of diabetes on postoperative visual acuity is largely related to the presence and severity of diabetic retinal disease. Diabetic retinopathy may occur in different stages, ranging from mild non-proliferative changes with microaneurysms and retinal hemorrhages to proliferative disease marked by neovascularization, bleeding, and scarring. As retinal damage progresses, the likelihood of achieving good postoperative vision becomes lower. (Klein et al. 2010) note that advanced diabetic retinopathy is associated with poorer visual outcomes after cataract surgery because structural retinal injury may already be established before the procedure. In this sense, cataract extraction may remove the lens opacity, but it

may not fully restore vision where diabetes has already damaged the posterior segment of the eye.

Diabetes is therefore a major comorbidity in the study of post-cataract visual acuity because it affects both the ocular environment and the patient's recovery potential. Its influence extends beyond the operation itself to include preoperative retinal status, metabolic control, and the risk of postoperative complications. For this reason, diabetes remains central in understanding variations in visual acuity outcomes after cataract surgery.

2.2.2 Prevalence

Diabetes has become increasingly prevalent worldwide and is now commonly found among patients presenting for cataract surgery. According to the International Diabetes Federation (Diabetes Atlas 2021), approximately 537 million adults were living with diabetes globally, and this number is expected to rise further. This growing burden is important for cataract care because older adults, who are already at increased risk of cataract, also carry a higher prevalence of diabetes. (Rossi et al. 2020) report that diabetes is common among cataract surgery candidates, with a substantial proportion of patients presenting with diabetic retinal changes at the time of surgery.

The association between diabetes and cataract is also clinically significant because diabetes contributes to earlier cataract development. (Kiziltoprak et al. 2019) explain that prolonged hyperglycemia accelerates lens opacity, thereby increasing the likelihood of cataract formation and the eventual need for surgical intervention. The high prevalence of diabetes among cataract patients means that its effect on postoperative visual acuity cannot be regarded as exceptional or incidental. Rather, it represents a common and important clinical issue that deserves specific attention within the broader study of comorbidities and surgical outcomes.

2.2.3 Mechanisms underlying the impact of diabetes

The influence of diabetes on postoperative visual acuity can be explained through several interrelated mechanisms. One of the most important is diabetic retinopathy, which affects the retinal microvasculature and may reduce visual function before surgery even takes place. (Wong et al. 2020) state that diabetic retinopathy damages the retinal blood vessels and may lead to progressive visual loss, thereby limiting the degree of visual improvement achievable after cataract extraction. In patients with significant retinal disease, surgery may improve media clarity without fully restoring retinal function.

A second important mechanism is diabetic macular oedema, which directly affects central vision. (Kim et al. 2019) explain that fluid accumulation in the macula compromises visual acuity and may persist or worsen after surgery, particularly in patients with poorly controlled diabetes. Since the macula is essential for sharp central vision, any edematous change in this region may substantially reduce the postoperative visual gain expected from cataract removal. This makes macular status a key determinant of visual prognosis in diabetic cataract patients.

Diabetes also promotes cataract formation itself and creates a more vulnerable ocular environment through chronic inflammation and oxidative stress. (Liao et al. 2019) note that diabetes is associated with earlier cataract development, while (Rhee et al. 2018) argue that poor glycaemia control increases intraocular inflammation and oxidative injury, which may contribute to retinal and neural damage. These mechanisms show that diabetes influences postoperative visual acuity in more than one way. It acts through pre-existing retinal pathology, macular compromise, metabolic instability, and impaired ocular healing, all of which may reduce the likelihood of optimal visual recovery after cataract surgery.

2.3 Factors influencing the impact of Diabetes

The effect of diabetes on visual acuity outcomes after cataract surgery is not uniform, as it is shaped by several clinical and contextual factors. One of the most important is blood sugar control. Poor glycaemia control is associated with worsening retinal damage, greater inflammatory activity, and a higher risk of postoperative complications, all of which may reduce visual recovery after surgery (Kwon et al. 2015). The duration of diabetes is also significant, because patients who have lived with the disease for a longer period are more likely to develop diabetic retinopathy, macular oedema, and other retinal changes that may limit postoperative visual improvement (Lee et al. 2018). In addition, the type and severity of diabetes may influence outcome, particularly where the disease is poorly controlled or already associated with advanced ocular manifestations (Wong et al. 2020).

Another important factor is the presence of additional comorbidities. Diabetes rarely occurs in isolation, especially among older adults who are the main recipients of cataract surgery. Coexisting conditions such as hypertension and chronic kidney disease may worsen vascular compromise, delay healing, and complicate postoperative management, thereby reducing the likelihood of achieving favorable visual acuity outcomes (Kim et al. 2019). This means that the impact of diabetes should not be understood only in terms of glucose metabolism, but also in relation to the wider burden of illness carried by the patient.

The influence of diabetes is further shaped by access to healthcare, socioeconomic position, and continuity of care. Patients in low-resource settings may experience delayed diagnosis of diabetic eye disease, irregular retinal screening, limited access to specialist care, and poor long-term monitoring. (Gonzalez et al. 2016) suggest that such social and health-system factors can worsen diabetic ocular outcomes by allowing retinal complications to progress before surgical intervention takes place. In this regard, the impact of diabetes on post-cataract visual acuity is shaped not only by biological disease processes, but also by the conditions under which diagnosis, treatment, and follow-up occur.

2.2.4 Clinical implications

The literature suggests that diabetic patients require more careful perioperative management than routine cataract patients because diabetes may reduce expected visual gain and increase the risk of postoperative complications. A comprehensive preoperative assessment is therefore essential. This should include detailed retinal evaluation to determine the presence and severity of diabetic retinopathy, macular oedema, or other posterior segment disease that may influence prognosis after surgery (Liao et al. 2019). Preoperative assessment should also include review of blood sugar control and associated systemic conditions such as hypertension, since these may affect both surgical safety and postoperative recovery (Burgess et al. 2018).

Another important implication is the need for good metabolic control before surgery**.** Maintaining stable blood sugar levels may reduce inflammatory responses, support tissue healing, and minimize the progression of diabetic complications that could compromise visual outcome (Rhee et al. 2018). Although cataract surgery can successfully remove lens opacity, the final visual result may still be limited where diabetes is poorly controlled or where retinal damage is already advanced. For this reason, glycaemia management should be regarded as part of visual outcome optimization rather than as a separate medical issue.

Diabetic patients also require close postoperative monitoring. (Kwon et al. 2015) emphasize the importance of regular follow-up after surgery in order to detect complications early, particularly where diabetic retinopathy or macular oedema may worsen after the procedure. Careful postoperative review is necessary to identify delayed healing, retinal changes, or recurrent visual disturbance that may reduce the long-term benefit of surgery. This is especially important in patients with longstanding diabetes or multiple comorbidities, where recovery may be slower and less predictable.

Finally, the literature supports the value of personalized treatment planning and counseling. (Lee et al. 2018) argue that management should be tailored to the patient's diabetic status, retinal findings, and associated comorbid conditions. Patients should also be counseled realistically about the possible extent of visual improvement, particularly where pre-existing diabetic retinal disease is present. In this way, the clinical management of diabetes in cataract surgery extends beyond the operation itself and becomes part of a broader strategy to improve postoperative visual acuity outcomes.

2.3 Hypertension

Hypertension is an important systemic comorbidity among patients undergoing cataract surgery, especially in older populations where chronic vascular conditions are common. In the context of this study, hypertension matters because it may reduce the extent of visual recovery after cataract surgery, even where the procedure itself has been technically successful. (Natali Christine, Lusiana Sinurat and Adella, 2022) report that hypertension is associated with postoperative visual acuity differences after phacoemulsification, suggesting that systemic vascular status may influence final visual outcomes. (Sa'at, Ghazali, Yaacob and Salowi 2022) likewise show that comorbid conditions reduce the likelihood of optimal visual improvement after cataract surgery, reinforcing the need to consider hypertension as more than a background medical condition. Hypertension should therefore be understood as a clinically relevant factor in the assessment of post-cataract visual acuity outcomes.

2.3.1 Mechanism underlying the Impact of Hypertension

The impact of hypertension on postoperative visual acuity is mainly linked to vascular and retinal changes. Persistent high blood pressure may cause narrowing of retinal blood vessels, reduced retinal perfusion, and impaired oxygen delivery to ocular tissues, all of which may affect visual recovery after surgery. (Natali Christine, Lusiana Sinurat and Adella.2022) suggest that systemic hypertension may influence postoperative visual acuity through its effect on ocular physiology and pressure-related changes. Where retinal circulation is compromised, the eye may not recover visual function fully even after removal of lens opacity. This means that hypertension may reduce the potential visual benefit of cataract surgery by affecting the posterior segment before surgery has even taken place.

Hypertension may also contribute to retinal injury through hemorrhages, exudative changes, cotton wool spots, and other manifestations of hypertensive retinopathy. Such damage weakens retinal function and may result in poorer visual prognosis after surgery. (Sa'at,

Ghazali, Yaacob and Salowi 2022) argue that systemic comorbidities influence postoperative visual improvement, especially where broader disease burden affects the eye's ability to heal and function normally. In addition, vascular stress may worsen oxidative injury and inflammatory processes within ocular tissues, thereby increasing the likelihood of suboptimal visual recovery. Although cataract surgery can restore media clarity, it cannot reverse pre-existing retinal damage caused by longstanding hypertension.

2.3.2 Factors influencing the impact of Hypertension

Several factors determine the extent to which hypertension affects visual acuity outcomes after cataract surgery. One of the most important is blood pressure control**,** because poorly controlled hypertension is more likely to produce ongoing vascular damage and less favorable postoperative recovery. (Natali Christine, Lusiana Sinurat and Adella.) indicate that blood pressure status is relevant to postoperative visual acuity, particularly where systemic instability affects ocular function. Another key factor is the duration of hypertension, as patients who have lived with the condition for many years are more likely to have cumulative retinal and vascular damage that limits the visual gain achieved after surgery.

The presence of additional comorbidities also intensifies the effect of hypertension on surgical outcomes. Hypertension commonly coexists with diabetes and other chronic conditions, and this combined burden may worsen retinal compromise and delay recovery. (Sa'at, Ghazali, Yaacob and Salowi 2022) note that multiple comorbidities are associated with poorer visual improvement after phacoemulsification, which suggests that hypertension may have a stronger effect when it forms part of a wider disease profile. In practical terms, the influence of hypertension on postoperative visual acuity depends not only on the condition itself, but also on how well it is controlled, how long it has been present, and whether it occurs alongside other diseases that affect ocular health.

2.3.3 Clinical Implications

The clinical implications of hypertension in cataract surgery begin with careful preoperative assessment. Patients with hypertension should undergo blood pressure evaluation together with retinal examination in order to identify possible vascular changes that may affect prognosis after surgery. (Zambouri 2007) emphasizes the importance of proper preoperative evaluation in surgical patients, while (Natali Christine, Lusiana Sinurat and Adella) show that hypertension has relevance for postoperative visual acuity assessment in ophthalmic surgery.

Preoperative identification of hypertensive retinal changes is therefore important for risk stratification and for counseling patients about realistic postoperative expectations.

Effective blood pressure management is also necessary in order to reduce perioperative and postoperative risk. Good systemic control may help minimize vascular stress, support healing, and reduce further retinal injury that could limit visual recovery. (Javed et al. 2023) argue that postoperative complications are better managed where patient risk factors are recognized early and monitored closely. In the same way, hypertensive cataract patients may benefit from closer postoperative review so that delayed recovery or ocular complications can be detected promptly. A personalized treatment approach is therefore important, particularly in patients with longstanding hypertension or coexisting systemic disease. In this study, hypertension is thus understood not only as a comorbidity present in cataract patients, but as a condition with direct implications for assessment, management, and final visual acuity outcomes.

2.4 Theoretical Framework

The theoretical framework for this study is the biopsychosocial model**,** which holds that health outcomes are shaped by the interaction of biological, psychological, and social factors. This model is appropriate for the present study because postoperative visual acuity after cataract surgery is not determined by surgery alone. Biological conditions such as diabetes, hypertension, glaucoma, and other comorbidities may directly influence retinal health, optic nerve function, healing, and inflammatory response. (Kiziltoprak, Tekin, Inanc and Goker 2019) show that systemic disease may affect ocular structures and cataract-related outcomes in important ways. (Sa'at, Ghazali, Yaacob and Salowi 2022) also indicate that patient-related clinical factors influence the likelihood of visual improvement after cataract surgery.

The biopsychosocial model is also useful because it allows this study to move beyond a narrow biomedical explanation of cataract surgery outcomes. Psychological readiness, treatment adherence, health literacy, and access to care may all shape how patients prepare for surgery, recover afterward, and evaluate the success of treatment. (Andersson, Bergstrand, Engström and Gustafsson 2020) argue that preoperative anxiety may affect postoperative recovery, which suggests that psychological state can influence surgical experience and rehabilitation. (Chelak and Chakole 2023) further emphasize that social determinants such as education, socioeconomic position, and healthcare access shape health outcomes across

disease conditions. The model therefore provides a holistic basis for understanding how comorbidities may affect visual acuity after cataract surgery in Harare.

2.4.1 Biological Factors

From a biological perspective, comorbidities influence cataract surgery outcomes by affecting the structures and physiological processes required for vision. Diabetes may lead to retinal microvascular damage, macular oedema, and earlier cataract formation, while hypertension may impair ocular perfusion and contribute to retinal vascular changes. (Kiziltoprak, Tekin, Inanc and Goker 2019) argue that diabetes has important implications for ocular health and cataract-related outcomes. (Natali Christine, Lusiana Sinurat and Adella) similarly suggest that systemic conditions such as diabetes and hypertension are associated with differences in visual acuity after phacoemulsification. These biological processes help explain why some patients fail to achieve the expected visual improvement after cataract extraction.

2.4.2 Psychological Factors

Psychological factors are also relevant because patients with multiple comorbidities may experience anxiety, uncertainty, and reduced confidence regarding surgical outcomes. Fear of complications or poor recovery may affect willingness to seek treatment, adherence to preoperative instructions, and compliance with postoperative review. (Andersson, Bergstrand, Engström and Gustafsson 2020) found that preoperative anxiety may influence postoperative recovery and patient experience. (Tan, Liu, Li, Qin, Sun and Wu 2022) also show that cataract surgery outcomes should not be understood only in terms of measured acuity, since visual function and quality of life are closely linked to the patient's subjective experience. In this study, psychological factors therefore help explain why recovery is not only biological, but also behavioral and experiential.

2.4.3 Social Factors

Social factors influence both the prevalence of comorbidities and the management of cataract patients before and after surgery. Access to screening, affordability of follow-up care, transport, education, and health literacy may determine whether comorbidities are detected early or only identified once visual damage has progressed. (Chelak and Chakole 2023) argue that social determinants strongly shape health outcomes and equity in care. (Kwedar, Arnold and Hesemann 2022) further indicate that recovery trajectories differ across patients with pre-existing health burdens, which may be worsened by unequal access to ongoing management.

In low-resource settings, these social realities are especially important because delayed diagnosis and inconsistent follow-up may reduce the visual benefits of cataract surgery. The biopsychosocial model is therefore appropriate because it captures the combined influence of disease, patient experience, and context.

2.5 Age Related Macular Degenerated (AMD)

Age-related macular degeneration (AMD) is an eye ailment that blocks out your central vision. It develops when age-related damage happens to the macula, which is the part of the eye that controls sharp, straight-ahead vision. The macula is part of the retina (light-sensitive tissue at the back of the eye). AMD is a common condition-it's one of the leading causes of vision loss in the elderly. AMD does not render a person totally blind, but the loss of central vision may worsen seeing faces, reading, driving, or working on close-up things such as cooking or repairs around the house. In some people, AMD develops slowly, whereas in others, it happens quite fast. If you are in your early stages of AMD, you may never detect any visual loss. So, regular eye tests are essential for discovering AMD. Age-Related Macular Degeneration (AMD) is a famous contributor to vision loss in older people that can severely reduce visual acuity results after cataract surgery (Liao et al. 2019).

Geographic atrophy-AMD produces geographic atrophy and permanently damages the RPE and photoreceptors, which leads to visual loss. (Bakri et al., 2023) Choroidal neovascularization-AMD also produces choroidal neovascularization that leads to leakage of fluids and blood into the retina, therefore also causing visual loss. (Yeo et al. 2019) Retinal pigment epithelium (RPE) Dysfunction-AMD produces dysfunction in the RPE, thereby causing a reduction in photoreceptor function with resulting visual loss. (Somasundaran et al., 2020)

2.5.1 Factors influencing impact of AMD

• Severity of AMD-The severity of AMD can affect visual acuity outcomes, with more severe disease associated with poorer outcomes. (Loughman & Sabour-Pickett, 2015)

• Type of AMD-The type of AMD, such as dry or wet AMD, can also affect visual acuity outcomes (Wong et al. 2020). AMD is classified into two kinds

1. Dry AMD Characterized by the shrinking of the macula, resulting to gradual visual loss. It is more frequent and accounts for around 90% of AMD cases.

2. Wet AMD-Involves the formation of aberrant blood vessels under the retina, leading to fast vision loss. This kind is less common but more severe. Both kinds of AMD can considerably

compromise visual acuity post-surgery, with wet AMD providing a greater immediate risk for vision impairment (Marchesi et al. 2024).

• Existence of Other Comorbidities-The existence of other comorbidities, such as diabetes or hypertension, can adversely impair visual acuity outcomes. (Nowakowska et al. 2019)

2.5.2 Clinical implications

Preoperative Assessment-The preoperative assessment should be comprehensive enough, including retinal evaluation, to rightly identify any patient with AMD. (Zambouri A 2007) Surgical Planning-The planning of surgery shall consider the prevalence and severity of AMD, along with the concomitant comorbid state. (Trusty et al. 2018) Postoperative Monitoring-Intensive postoperative monitoring is all the more paramount towards recognition and management of any complications arising out of AMD. (Javed et al. 2023)

2.5.3 Conclusion

In conclusion, it can be seen that AMD plays a considerable role in determining the result of visual acuity after cataract surgery. The understanding of the factors and mechanisms underlying the impact of AMD on the results and the factors that modify visual results, are important in achieving optimum care for patients. In order to mitigate any potential negative effect of AMD on the visual acuity outcome, a comprehensive preoperative assessment, surgical planning, and postoperative monitoring should be ensured.

2.6 Glaucoma

Post-cataract surgery-related glaucoma can indeed affect visual acuity. Different studies put forth findings in support of the presence of glaucoma impacting visual acuity as an adverse prognostic factor in comparison with the case without glaucoma. (Dhawan et al. 2019)

2.6.1 Mechanism underlying the impact of glaucoma

Optic Nerve Damage-Glaucoma has an implication on the optic nerve, damages it, and finally causes visual hazards (Weber et al. 2008). Visual Field Loss-Glaucoma causes loss of visual fields, thereby preventing accurate ophthalmological outcomes (Weber et al. 2008b). Altered IOP dynamics-Glaucoma induces an alteration in IOP dynamics, raising IOP that causes damage to the optic nerve culminating in loss of vision (Asrani et al. 2024). Cataract Surgery-

Induced IOP Fluctuations-Neutral changes in IOP induced by cataract surgery advocate the complications of glaucomatous conditions and interfere with visual acuity outcomes (Kim et al. 2019).

2.6.2 Factors influencing the impact of glaucoma

Severity of Glaucoma and Poor visual acuity results are considered a greater severity of glaucoma, thereby implying the severity of glaucoma of being the cause of visual acuity outcomes (Lee et al. 2020).

Type of Glaucoma-According to the type of glaucoma, such as open-angle or angle closure glaucoma, the visual acuity outcome may vary (Rhee et al. 2018).

Preoperative IOP Management-Managing IOP preoperatively affects visual acuity outcomes; better-controlled IOP is correlated with better results (Lv et al. 2018).

2.6.3 Clinical implications

Preoperative Assessment-In the cases of glaucoma, an effective, comprehensive preoperative evaluation encompassing diagnosis of glaucoma and monitoring of IOP must be conducted to pinpoint affected individuals (Lee et al. 2020). IOP Management-Ensuring effective IOP management will curb the detrimental effects of glaucoma on visual acuity outcomes (Rhee et al. 2018). Postoperative Monitoring-Any problem linked to glaucoma shall be diagnosed and treated through vigilant postoperative monitoring (Lv et al. 2018).

2.7 Other Comorbidities (e.g., Cardiovascular Diseases, Chronic Kidney Disease)

Beyond diabetes, hypertension, glaucoma, and age-related macular degeneration, other chronic conditions may also influence visual recovery after cataract surgery. Patients who present with broader multimorbidity often have reduced physiological reserve, greater vascular compromise, and more complex perioperative needs, all of which may affect postoperative visual outcomes. (Sa’at, Ghazali, Yaacob and Salowi 2022) found that the presence of multiple comorbidities was associated with less favorable visual improvement after phacoemulsification. (Kwedar, Arnold and Hesemann 2022) likewise observed that patients with pre-existing health problems showed variable recovery patterns after cataract surgery, suggesting that the burden of additional disease may affect not only final visual acuity but also the speed and stability of recovery.

Cardiovascular disease and chronic kidney disease are relevant in this context because they may worsen systemic vascular function, inflammatory status, and healing capacity. Even where these conditions do not directly damage the lens, they may create a less favorable environment for postoperative recovery and may coexist with other vision-threatening disorders. (Nowakowska et al. 2019) show that chronic diseases frequently cluster together, which means that cataract patients often present with overlapping medical burdens rather than isolated conditions. (Tan et al. 2022) also demonstrate that postoperative outcomes are shaped by preoperative health status, reinforcing the view that wider systemic illness may influence both visual function and perceived recovery after cataract surgery. For this reason, other comorbidities deserve consideration in studies examining visual acuity outcomes after cataract surgery.

2.8 Management Strategies for comorbidities in Surgery Preoperative

Preoperative management is essential in patients with comorbidities because the quality of postoperative visual recovery depends partly on the stability of underlying disease before surgery. In diabetic patients, thorough retinal examination is necessary to detect diabetic retinopathy or macular involvement that may limit visual gain after cataract extraction. (Kiziltoprak, Tekin, Inanc and Goker 2019a) emphasize the close relationship between diabetes and cataract-related ocular complications. (Bin Rakhis et al. 2022) further argue that good glycaemia control is important in reducing complications associated with diabetes management. These findings suggest that blood sugar control should be treated as part of surgical preparation rather than as a separate medical issue.

Preoperative care is equally important in hypertensive patients and in those with complex ocular disease. Blood pressure should be assessed and controlled before surgery because systemic instability may increase perioperative risk and influence postoperative outcome. (Zambouri 2007) stresses the importance of adequate preoperative evaluation in surgical care. (Natali Christine, Lusiana Sinurat and Adella) also suggest that hypertension and related ocular factors are relevant to postoperative visual acuity. In addition, modern imaging modalities such as optical coherence tomography may strengthen preoperative planning by revealing subtle retinal or macular pathology that could alter prognosis after cataract surgery. (Mokhtari, Maris and Fiorini 2025) show that optical coherence tomography has become an

important technology in ocular assessment. Preoperative optimization therefore involves systemic control, retinal evaluation, and appropriate risk stratification.

2.9 Intraoperative Considerations

Intraoperative management should be tailored to the patient's comorbidity profile in order to reduce avoidable risk and protect postoperative visual outcomes. In patients with glaucoma or optic nerve vulnerability, surgical techniques that minimize abrupt intraocular pressure fluctuation are especially important. (Chen et al. 2015) show that phacoemulsification influences intraocular pressure in glaucoma patients, which has implications for surgical planning. (Asrani et al. 2024) further emphasize the importance of intraocular pressure dynamics in glaucoma-related visual function. These insights suggest that intraoperative care should not be uniform for all cataract patients, especially where comorbid ocular disease may reduce tolerance to pressure changes.

In diabetic patients, careful surgical handling is also important because prolonged manipulation and increased inflammatory stress may worsen existing retinal compromise. (Galway et al. 2021) discuss the perioperative challenges associated with diabetes and the importance of tailoring management to the patient's condition. (Richter and Coleman .2016) likewise note that glaucoma-related surgical considerations require modification of operative approaches where ocular status is already compromised. In this study, intraoperative management is therefore viewed as part of the broader process through which comorbidities may influence postoperative visual acuity. The surgical procedure must be responsive to the patient's systemic and ocular status if better outcomes are to be achieved.

2.10 Postoperative Management

Postoperative management is central to achieving favorable visual outcomes in cataract patients with comorbidities because surgery alone does not guarantee stable recovery. Patients with systemic and ocular comorbidities may be more vulnerable to delayed healing, inflammation, recurrent visual disturbance, and complications that reduce the long-term benefit of surgery. (Javed et al. 2023) argue that postoperative complications are better managed where patient risk factors are identified early and monitored closely. (Kwedar, Arnold and Hesemann .2022) also show that recovery patterns differ among patients with pre-existing health conditions, which supports the need for closer follow-up in medically complex cataract patients. Postoperative review is therefore essential in order to detect problems early and respond before visual outcome is permanently affected.

Postoperative care should also include patient education, adherence support, and realistic counseling regarding recovery. Patients with multiple comorbidities may need more explanation about the possible limits of visual improvement, especially where pre-existing retinal or optic nerve damage is present. (Tan, Liu, Li, Qin, Sun and Wu .2022) show that visual outcome after cataract surgery should be understood alongside patient-reported visual function and quality of life. (Andersson, Bergstrand, Engström and Gustafsson 2020) further suggest that psychological factors influence postoperative recovery, indicating that emotional support and reassurance may also be important. In this way, postoperative management extends beyond medication and review visits to include monitoring, counseling, and support for long-term rehabilitation.

2.11 Socioeconomic Factors Influencing Management of Comorbidities and Access to Cataract Surgery

Economically and socially disadvantaged through the eyes of the patient tend to be additionally affected in managing comorbidities and receiving excellent cataract surgery; therefore, his or her health outcomes suffer in a disproportionate manner. Socioeconomic factors act as constraints on the patients for seeking medical help on time, for sticking to prescribed therapies, or for using surgical methods or technologies.

2.11.1 Healthcare Access in Low-Resource Settings

Ophthalmologists and specialist eye care facilities are in short supply in some parts of Zimbabwe and the African continent. The rural and underserved zones are hit the hardest since patients often have to go great distances to obtain surgical services. When the services are there, financial constraints stop the client from getting the surgery for their cataracts or controlling systemic conditions like diabetes and hypertension, which further impact the surgical outcomes. The availability of specialist eye care centers is limited alongside a shortage of skilled ophthalmologists, through which access to quality care becomes hampered. Patients living at rural or underserved locations become even more vulnerable due to logistical challenges like travel expenses and local healthcare infrastructure. In many places of Zimbabwe and Africa, there is a shortage of eye care facilities and trained surgeons. Rural and underserved areas are those affected by the scarcity since the patients are forced to travel long distances to get surgical care, if at all available.

2.11.2 Cost of Treatment

Due to the high cost of imaging modalities of the present age such as OCT, including the newer pharmaceutical treatments such as anti-VEGF therapy, the patients find themselves unable to afford either one or both. This financial burden is more felt by lower-class people, resulting in delayed diagnosis and inadequate treatment of other morbidities that affect outcomes after the surgery.

2.11.3 Insurance Coverage and Out-of-Pocket Expenses

Insurance coverage acts as a crucial factor in cataract surgeries and comorbidities management. However, in many countries, the reimbursement for cataract surgery could be partial at best, more particularly in the case of advanced surgical procedures or expensive intraocular lenses (IOLs). Those who are inadequately insured or not insured at all must bear the cost upfront and could be discouraged from seeking the optimum treatment. A majority of Africans, especially the Zimbabweans, pay health care out of their pockets since insurance cover is either poor or unattainable. If at all, these plans may not cover advanced procedure, or premium intraocular lenses, or even follow-ups for the comorbidities.

2.11.4 Health Literacy and Awareness

Low health literacy among marginalized population groups may also result in delayed recognition and treatment of concomitant conditions like diabetic retinopathy or macular degeneration, ultimately affecting the prognosis of the surgery. There is no information about the significance of frequency of eye checks and systematic stages of the diseases by the time of surgery.

2.11.5 Cultural and Social Norms.

Thus, different attitudes and social conventions influence treatment-seeking behavior. In certain societies, cataract surgery might be somewhat de-prioritized, and surgery due to fear, misinformation, or traditional medicine might be avoided. Gender barriers may thus work to limit women's access, along with additional challenges such as care responsibilities and financial dependency.

2.11.6 Equity in Emerging Technologies

Although there is a bright glint of hope cast by AI-predictive models and novel therapeutic agents for humanity, the wider dissemination of such interventions is hampered by lack of facilities and cost constraints in low-resource regions. Few interventions such as subsidies,

technology transfer, and allocating resources for the local health system may ensure that such developments are available to the needy.

2.12 Future directions and research gaps unmet needs

In the wake of long voices discussing cataract surgery and the coexisting disorders, a few researches study the co-effects of multiple disorders. For example, the systematic review by (Kwon et al. 2021) states that most evidence deals with single comorbidities without investigating the interactional effects of multiple illnesses. There are no data regarding the long-term effect of these comorbidities on visual function and postoperative quality of life following cataract surgery. Research carried out by (Ghosh et al. 2022) found an existing large gap in knowing how these disorders affect the well-being of a patient as time passes.

Though enormous developments in cataract surgical technique have occurred, the influence of comorbidities on postoperative visual acuity has received scant attention. Studies emphasize the need for a more complete understanding of how certain systemic and ocular diseases impact surgery outcomes (Shorstein et al. 2020). For instance, further research is warranted on the long-term implications on visual recovery of poorly controlled diabetes or concomitant retinal illnesses such as macular degeneration. Besides that, larger prospective studies may also be lacking that examine the cumulative effect of multiple comorbidities on visual outcomes, thus limiting the capacity for establishment of evidence-based care protocols (Singh et al. 2021). These issues faced by the comorbid patients are further exacerbated by inequalities in healthcare access, particularly in low-resource settings, thus demanding equity-focused treatment research.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methodology used to examine the impact of comorbidities on visual acuity outcomes among post-cataract surgery patients at Parirenyatwa Hospital in Harare. The chapter explains the research design, study period, study population, inclusion and exclusion criteria, diagnostic criteria for visual outcomes, data collection procedures, statistical analysis, potential confounding factors, and ethical considerations. A clear and consistent methodology is important because it ensures that the methods used are directly aligned with the study objectives and the results reported later in the dissertation. (Creswell and Creswell 2023) argue that a sound methodology should present a coherent link between the research problem, the study design, the data source, and the analytical approach. In the same way, (Bryman .2021) emphasises that methodological clarity helps the reader understand how evidence was generated and how conclusions were reached.

3.2 Study Design

Figure 1 Flow Chart of Study Design



This study adopted a quantitative retrospective hospital-based record review design. The study relied on secondary clinical data extracted from patient medical records at Parirenyatwa Hospital. The retrospective design was appropriate because the cataract surgeries had already been performed and the required demographic, clinical, comorbidity, and postoperative visual acuity data were already available in hospital records. (Babbie 2021) notes that retrospective

designs are useful where existing records provide relevant data for examining associations between variables. (Walliman 2021) similarly explains that secondary data designs are appropriate when the researcher seeks to analyse previously recorded information in a systematic and structured manner.

The design was suitable for this study because it allowed the researcher to examine whether different comorbidity categories were associated with variations in postoperative visual acuity outcomes. The study did not involve prospective follow-up by the researcher, nor did it involve qualitative interviews. It was therefore not a mixed-methods, prospective cohort, or qualitative study. Instead, it was a quantitative review of existing hospital data, designed to describe patient characteristics and compare visual acuity outcomes across comorbidity groups. (Fischer, Boone and Neumann .2023) argue that quantitative designs are appropriate where the purpose is to measure variables systematically and identify patterns across cases. This design therefore aligns with the results reported in Chapter 4.

3.3 Study Period

The study covered patient records for the period December 2025 to June 2026. This period was selected because it provided accessible hospital records with documented cataract surgery outcomes, including postoperative visual acuity and comorbidity information. The period also allowed sufficient coverage of patient cases to support meaningful description of demographic patterns, comorbidity categories, and visual outcome distribution.

3.4 Study Population

The study population consisted of medical records of patients who underwent cataract surgery at Parirenyatwa hospital during the study period. The hospital was selected because they serve as an important referral and service centres for ophthalmic care in the province and therefore provided an appropriate clinical setting for the study. The target population comprised cataract surgery patients aged 50 years and above whose records contained documented information on comorbidity status and postoperative visual acuity. A total of 120 eligible patient records were included in the study.

The study used total inclusion of eligible records rather than selecting a smaller sample from the available files. (Häder 2022) explains that where the number of accessible cases is manageable, inclusion of all eligible records strengthens coverage and reduces unnecessary

sampling loss. In this study, total inclusion was appropriate because the available records were limited to 120 and all eligible cases could be reviewed within the study period.

3.5 Inclusion and Exclusion Criteria

Table 1: Inclusion and Exclusion Criteria

CRITERION	INCLUSION	EXCLUSION
AGE	Patients aged 50 years and above	Patients aged below 50 years
CATARACT STATUS	Diagnosed with cataract and underwent completed cataract surgery	Cataract surgery not performed or incomplete surgery
COMORBIDITY STATUS	Presence of at least one documented comorbidity under study, including diabetes, hypertension, glaucoma, AMD, or other recorded comorbidities	No documented comorbidity or unclear comorbidity status
VISUAL ACUITY DATA	Documented preoperative visual acuity and postoperative visual acuity in the medical record	Missing preoperative or postoperative visual acuity data
RECORD COMPLETENESS	Complete and accessible patient medical records	Incomplete, illegible, or inaccessible records

The inclusion and exclusion criteria were designed to ensure that only records relevant to the study topic were analysed. Most importantly, the corrected criteria now include both systemic comorbidities and ocular comorbidities under investigation, rather than excluding glaucoma and age-related macular degeneration, which are central to the study. (Neuman 2022) argues that inclusion criteria must reflect the variables being studied, otherwise the design becomes logically inconsistent. This correction therefore aligns the methodology with both the research topic and the Chapter 4 results.

3.4 Data Collection Procedure and Diagnostic Criteria for Visual Outcome

Data were collected from patient medical records using a structured data extraction format. The extracted variables included age, sex, level of education, occupation, spectacle use, type of comorbidity, duration of comorbidity, preoperative visual acuity, and postoperative visual acuity. Data extraction from secondary sources requires consistency in variable definition and careful handling of incomplete records in order to improve the credibility of findings

(Saunders, Lewis and Thornhill, 2023). The use of a structured extraction format in this study helped ensure that the same variables were collected from each eligible record.

Postoperative visual acuity outcomes were classified using the categories applied in Chapter 4. To ensure consistency between the methodology and results chapters, the classification below should be used throughout the dissertation.

Table 2: Diagnostic Criteria for Visual Outcome

Visual Outcome	**Definition**
Good	**VA of 6/18 or better**
Moderate	**VA worse than 6/18 up to 6/36**
Poor	**VA worse than 6/36**

Visual acuity outcomes were based on documented postoperative assessment, as reported in the hospital records. This classification was used to group patients into outcome categories for descriptive analysis and comparison across comorbidity groups. It is important that the same definitions be used consistently in Chapter 4, particularly under Sections 4.3 and 4.4, so that the methodology and results remain fully aligned.

3.5 Statistical Analysis

The extracted data were coded, entered, and analysed using quantitative descriptive procedures. Descriptive statistics were used to summarise patient characteristics and outcome patterns. These included frequencies, percentages, mean, standard deviation, and mode, where appropriate. (Hazra 2023) explains that descriptive statistics are central in biomedical research because they summarise observed patterns clearly before interpretation begins. (Carlucci and Wright 2021) similarly note that descriptive analysis is appropriate where the purpose is to present the distribution of variables across a defined dataset.

Given the results reported in Chapter 4, the analysis focused on demographic distribution, distribution of comorbidity groups, duration of comorbidities, and distribution of postoperative visual acuity outcomes. Cross-tabulation was also used to show postoperative visual acuity categories across the different comorbidity groups. Because the reported results chapter does not present qualitative themes or inferential outputs such as chi-square or t-test values, the methodology has been aligned to the analysis that was actually reported.

Table 3: Statistical Analysis Methods

Analysis Type	Method	Purpose
Descriptive statistics	Frequencies and percentages	To summarise demographic characteristics such as age, sex, education, occupation, and spectacle use
Descriptive statistics	Mean, standard deviation, and mode	To summarise continuous or summary variables such as age and duration of comorbidity
Cross-tabulation	Comorbidity group by postoperative visual acuity category	To show the distribution of visual outcomes across comorbidity groups
Tabular and graphical presentation	Tables, bar charts, and pie charts where applicable	To present findings clearly and facilitate interpretation

3.8 Potential Confounding Factors

Table 4: Potential Confounding Factors and Method of Control

CONFOUNDER	JUSTIFICATION FOR CONTROL	METHOD OF CONTROL
AGE	Older patients may have reduced visual recovery because of age-related ocular degeneration	Restricted to patients aged 50 years and above and reported descriptively in the results
GENDER	Gender-related differences in health-seeking behaviour and recovery may influence outcome patterns	Reported descriptively and considered during interpretation of findings
PREOPERATIVE VISUAL ACUITY	Baseline visual acuity can influence the extent of postoperative improvement	Only records with documented preoperative visual acuity were included
DURATION OF COMORBIDITY	Longstanding comorbidities may result in more severe ocular or systemic damage	Duration of comorbidity was extracted and reported descriptively

RECORD COMPLETENESS	Missing or incomplete data can distort outcome analysis	Incomplete or inaccessible records were excluded from the study

Potential confounding factors were recognised because postoperative visual acuity is shaped by more than comorbidity category alone. In record-based clinical studies, control of confounders is often achieved through restriction, eligibility criteria, descriptive reporting, and careful interpretation rather than advanced modelling alone (Babbie, 2021). In this study, the available records did not support multivariable modelling, so confounders were managed through inclusion criteria and transparent reporting.

3.6 Ethical Considerations

Ethical approval for the study was obtained through the appropriate institutional procedures before data collection commenced. Permission to access hospital records was also sought from the relevant authorities at Parirenyatwa Hospital. Because the study relied on secondary clinical data, no direct contact with patients was required. Confidentiality was maintained throughout the study by ensuring that no patient names or personal identifiers were included in the data extraction sheet or in the reporting of results. (Von Unger .2021) argues that ethical reflexivity is essential in research involving sensitive data, especially where health records are used. (Creswell and Creswell 2023) similarly emphasise that confidentiality, secure data handling, and respect for participants remain central even in record-based studies.

The extracted data were used strictly for academic purposes and stored securely. Only information relevant to the study objectives was collected. This helped minimise unnecessary exposure of patient information and ensured that the study complied with basic ethical principles of confidentiality, privacy, and responsible data use.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the findings of the study on the impact of comorbidities on visual acuity after cataract surgery. The results are presented in a structured manner using tables and figures. The chapter begins with the demographic characteristics of the participants, followed by the distribution of comorbidity categories, the overall postoperative visual acuity outcomes, and the visual acuity outcomes according to comorbidity group. This sequence was adopted to ensure that the reader first understands the profile of the study population before moving to the clinical variables and visual outcomes that address the objectives of the study.

4.2 Demographic Characteristics of Participants

4.2.1 Demographics of participants

A total of 120 patient records were included in the study. Of these, 68 participants (56.7%) were male, while 52 participants (43.3%) were female. This indicates that male patients formed the larger proportion of the study population.

In terms of age, the participants were all aged 50 years and above. The mean age of the participants was 64.98 years, with a standard deviation of 10.645 years, while the modal age was 67 years. The age distribution further showed that the largest proportion of participants fell within the 50–60 years age category, accounting for 49 participants (40.8%). This was followed by the 61–75 years category with 46 participants (38.4%). Participants above 75 years constituted the smallest age group, with 25 participants (20.8%).

Educational attainment varied across the study population. The majority of participants, 73 (60.8%), had no formal education. A further 42 participants (35.0%) had secondary education, while only 5 participants (4.2%) had tertiary education. This pattern suggests that most of the study participants had relatively low formal educational attainment.

With regard to spectacle use, 88 participants (73.3%) were recorded as spectacle wearers, while 32 participants (26.7%) did not wear spectacles. Occupational data showed that the largest category in the dataset was labelled “Non”, accounting for 82 participants (68.3%). Self-employed participants were 30 (25.0%), whereas employed participants accounted for 8 (6.7%).

The demographic characteristics of the participants are presented in Table 5.

Table 5: Demographic characteristics of participants (N = 120)

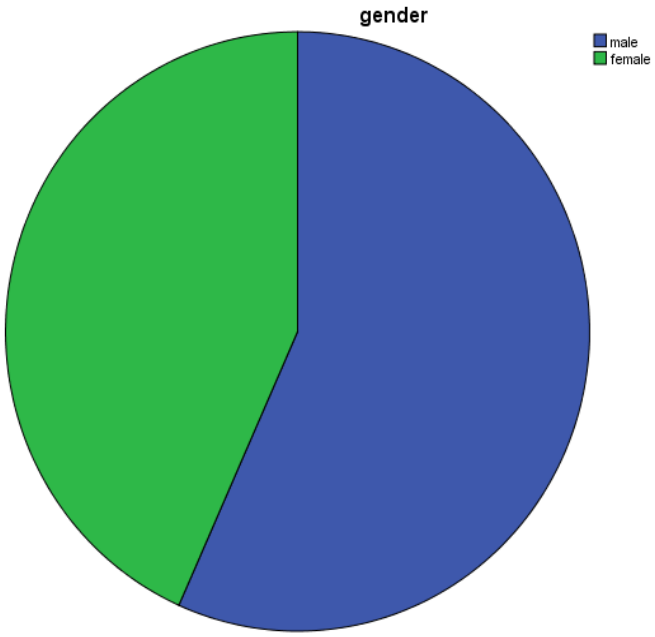
Variable	Category	Male n (%)	Female n (%)	Total n (%)
Age group (years)	50–60	28 (23.3)	21 (17.5)	49 (40.8)
	61–75	26 (21.7)	20 (16.7)	46 (38.4)
	Above 75	14 (11.6)	11 (9.2)	25 (20.8)
Level of education	None	40 (33.3)	33 (27.5)	73 (60.8)
	Secondary	25 (20.8)	17 (14.2)	42 (35.0)
	Tertiary	3 (2.5)	2 (1.7)	5 (4.2)
Spectacle use	Yes	50 (41.6)	38 (31.7)	88 (73.3)
	No	18 (15.1)	14 (11.6)	32 (26.7)
Occupation	Self-employed	10 (8.3)	20 (16.7)	30 (25.0)
	Employed	5 (4.2)	3 (2.5)	8 (6.7)
	Non	53 (44.2)	29 (24.1)	82 (68.3)
Gender		68 (56.7)	52 (43.3)	120 (100.0)

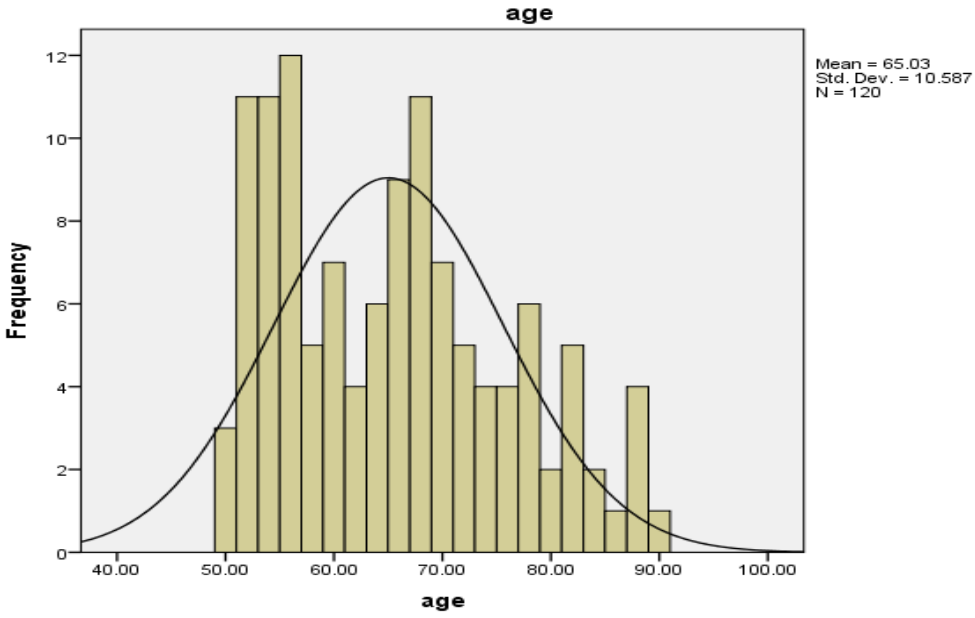
4.2.2 Summary of demographic findings

The demographic profile presented in Table 5 shows that the study population was predominantly male and largely concentrated within the 50–75-year age range. The results also show that most participants had no formal education and that spectacle use was common among the majority of the participants. The occupational data further indicate that the largest proportion of participants fell within the category recorded as “Non”. Overall, these findings provide the background characteristics of the study population and form the basis for understanding the comorbidity and visual outcome results that follow.

Figure 2 presents the gender distribution of participants, while **Figure 3** presents the age group distribution.

Figure 2 Gender Distribution of Patients





Figures 3 Age Group Distribution

4.3 Distribution of Comorbidity Categories

After presenting the demographic profile of the participants, the next stage of the analysis examined the comorbidity categories recorded in the patient files. All 120 participants had at

least one documented comorbidity. The most frequently recorded comorbidity was diabetes, which was identified in 43 participants (35.8%). This was followed by hypertension in 31 participants (25.8%), glaucoma in 24 participants (20.0%), and age-related macular degeneration in 12 participants (10.0%). Other comorbidities accounted for 10 participants (8.3%).

These findings show that diabetes and hypertension constituted the largest comorbidity groups in the study population, while glaucoma and AMD represented smaller but still important proportions. The data therefore indicate that both systemic and ocular comorbidities were present among the patients included in the study.

The duration of comorbidities was also assessed. The mean duration of comorbidity was 6.98 years, with a standard deviation of 6.109 years. This suggests variation in the length of time participants had lived with their recorded conditions prior to cataract surgery.

Figure 4 shows the distribution of participants by comorbidity group, while **Figure 5** presents the duration of comorbidities.

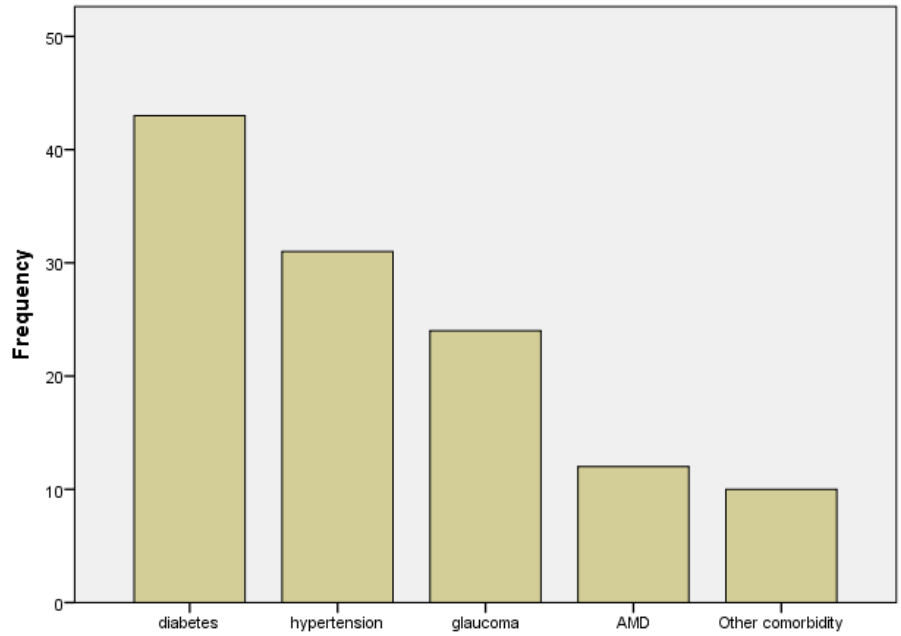
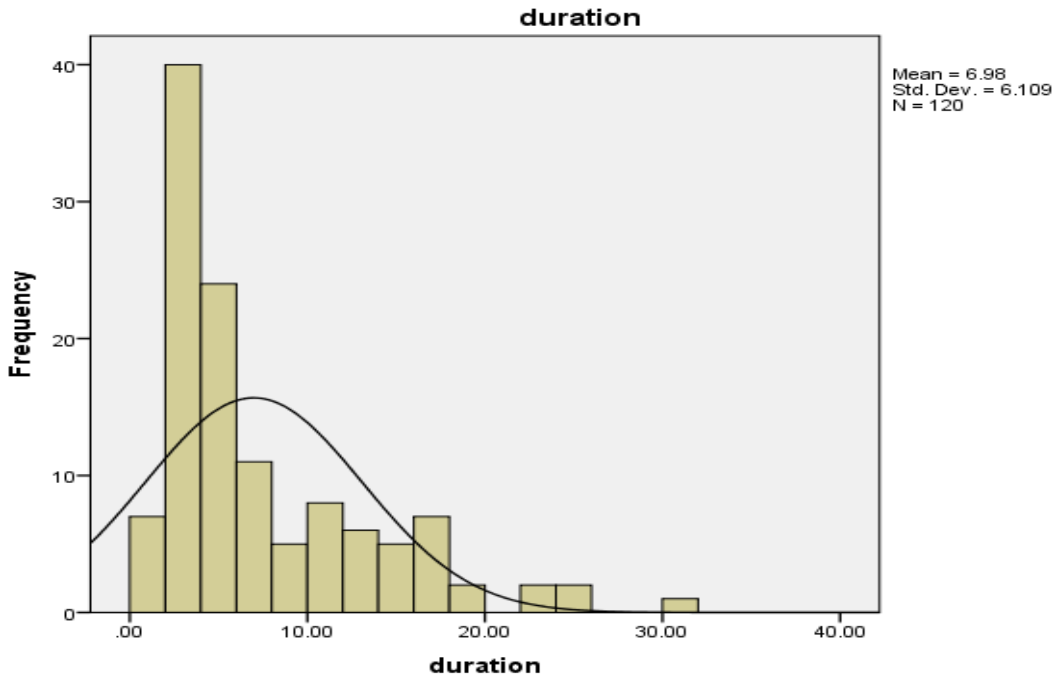


Figure 4 **Duration of Comorbidities**



4.4 Postoperative Visual Acuity Outcomes

Following the description of comorbidity categories, the results were analyzed in relation to postoperative visual acuity outcomes. Visual acuity was assessed six weeks after cataract surgery and grouped into three outcome categories. Good visual acuity was defined as 6/18 or better, moderate visual acuity as worse than 6/18 up to 6/36, and poor visual acuity as worse than 6/36.

The overall postoperative visual acuity findings showed that 23 participants (19.2%) achieved good visual acuity. A total of 30 participants (25.0%) had moderate visual acuity outcomes, while 67 participants (55.8%) had poor visual acuity outcomes. These findings indicate that poor postoperative visual acuity was the most common outcome category in the study population, followed by moderate outcomes, while good outcomes accounted for the smallest proportion.

The results presented in this section provide the general visual outcome pattern of the study before the findings are examined according to specific comorbidity groups.

4.5 Visual Acuity Outcomes by Comorbidity Group

To further assess the pattern of postoperative visual acuity, the outcomes were analyzed across the different comorbidity groups. This made it possible to determine how the visual acuity categories were distributed within each recorded comorbidity classification.

Among participants with diabetes, 10 (8.3%) had good postoperative visual acuity, 11 (9.2%) had moderate visual acuity, and 22 (18.3%) had poor visual acuity. Diabetes was therefore the most frequently represented comorbidity group in the dataset and also recorded the largest number of participants with poor visual acuity.

In the hypertension group, 9 participants (7.5%) had good visual acuity, 8 (6.7%) had moderate visual acuity, and 14 (11.7%) had poor visual acuity. This indicates that poor postoperative visual acuity was also the most frequent outcome within the hypertension category.

For participants with glaucoma, only 2 (1.7%) achieved good visual acuity, while 5 (4.2%) had moderate visual acuity and 17 (14.2%) had poor visual acuity. In the AMD group, none of the participants recorded good visual acuity. Instead, 3 participants (2.5%) had moderate visual acuity and 9 (7.5%) had poor visual acuity. Among those classified under other comorbidities, 2 participants (1.7%) had good visual acuity, 3 (2.5%) had moderate visual acuity, and 5 (4.2%) had poor visual acuity.

These findings show that poor visual acuity was the most frequent postoperative outcome across all comorbidity categories, although the distribution differed in magnitude from one group to another.

Table 6: Best corrected visual acuity by comorbidity group (N = 120)

Comorbidity	**Good n (%)**	**Moderate n (%)**	**Poor n (%)**	**Total n (%)**
Diabetes	10 (8.3)	11 (9.2)	22 (18.3)	43 (35.8)
Hypertension	9 (7.5)	8 (6.7)	14 (11.7)	31 (25.8)
Glaucoma	2 (1.7)	5 (4.2)	17 (14.2)	24 (20.0)
AMD	0 (0.0)	3 (2.5)	9 (7.5)	12 (10.0)
Other comorbidities	2 (1.7)	3 (2.5)	5 (4.2)	10 (8.3)
Total	**23 (19.2)**	**30 (25.0)**	**67 (55.8)**	**120 (100.0)**

4.6 Summary of Key Findings

The results presented in this chapter show that the study population consisted mainly of male participants and that most participants were between 50 and 75 years of age. A large proportion had no formal education, and most were spectacle wearers. With regard to clinical

characteristics, diabetes emerged as the most common comorbidity, followed by hypertension, glaucoma, AMD, and other comorbidities.

The findings further show that poor postoperative visual acuity was the dominant outcome category in the overall sample. When the outcomes were examined by comorbidity category, poor visual acuity remained the most frequent outcome across all groups. The diabetes group had the highest number of participants overall, while the glaucoma and AMD groups showed relatively low frequencies of good visual acuity.

This section summarizes the findings only. The meaning and implications of these patterns are discussed in the next chapter.

4.7 Conclusion

This chapter has presented the findings of the study in a structured sequence, beginning with participant demographics, followed by comorbidity distribution, overall postoperative visual acuity outcomes, and visual acuity outcomes by comorbidity group. The results show that the participants had varied demographic characteristics and that several comorbidity categories were represented in the study. The findings also show that poor postoperative visual acuity was the most common visual outcome recorded in the sample. The next chapter discusses these findings in relation to the study objectives and the literature reviewed in Chapter 2.

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter discusses the findings presented in Chapter 4 in relation to the objectives of the study and the literature reviewed in Chapter 2. The purpose of the discussion is not to restate the numerical results, but to interpret them within the broader context of cataract surgery outcomes and comorbidity-related visual risk. The chapter therefore examines the findings according to the original objectives of the study, namely the effect of systemic comorbidities on postoperative visual acuity, the influence of ocular comorbidities on visual recovery, the management challenges associated with patients who have comorbidities, and the strategies that may optimize visual outcomes after surgery. In doing so, the chapter explains how the results from Sekuru Kaguvi Eye Hospital contribute to understanding the impact of comorbidities on postoperative visual acuity in Harare.

5.2 Discussion of Participant Characteristics

The demographic profile of the study provides useful context for interpreting the clinical findings. Most participants were male, and the majorities were aged between 50 and 75 years. This age pattern is not unexpected, because cataract is strongly associated with ageing and chronic comorbid conditions also become more common in older adults. (Kiziltoprak et al. 2019a) note that cataract and systemic disease frequently coexist in ageing populations, making this age distribution clinically plausible. The large proportion of participants with no formal education is also relevant because education often shapes health literacy, treatment-seeking behavior, and long-term disease management. (Chelak and Chakole 2023) argue that social determinants of health, including education and access to care, influence both disease burden and health outcomes. The demographic profile therefore supports the view that postoperative visual acuity is shaped within a broader medical and social context.

The high proportion of spectacle users in the sample also suggests that many participants had longstanding visual difficulties before surgery. Although spectacle use does not itself explain postoperative outcomes, it may reflect an existing history of visual compromise or prior correction attempts before cataract extraction. The occupational profile, in which the largest group was recorded under the category “Non”, may also point to reduced economic participation among many patients, although the dataset does not permit a deeper occupational interpretation. Taken together, these demographic characteristics indicate that the study population was composed largely of older adults with possible long-standing visual

and health-related needs. This is important because the effects of comorbidities on postoperative visual acuity may be more pronounced in populations already burdened by age, reduced education, and limited health resources.

5.3 Objective 1: Impact of systemic comorbidities on postoperative visual acuity

The first objective of the study was to assess the impact of systemic comorbidities on visual acuity outcomes after cataract surgery. The findings indicate that diabetes and hypertension were the most common systemic comorbidities among the participants, and both groups showed a substantial proportion of poor postoperative visual acuity outcomes. Diabetes was the most prevalent comorbidity overall and also contributed the largest number of participants with poor visual acuity. This pattern supports the view that diabetes is a major systemic condition of concern in cataract surgery patients. (Kiziltoprak et al. 2019a) argue that diabetes affects both cataract formation and postoperative visual prognosis because of its relationship with retinal pathology and metabolic instability. (Rossi et al. 2020) further show that diabetic retinopathy is common among cataract surgery candidates, which helps explain why some diabetic patients fail to achieve satisfactory visual improvement even after lens opacity has been removed.

The findings also align with the biological mechanisms discussed in Chapter 2. Diabetes may compromise retinal blood vessels, contribute to diabetic macular oedema, and worsen inflammatory processes that limit visual recovery after surgery. (Galway et al. 2021) emphasize that diabetic patients present specific perioperative challenges that may complicate surgical recovery. (Bin Rakhis et al. 2022) similarly highlight the importance of metabolic control in diabetes management, which is relevant because poor glycemic regulation may reduce the likelihood of favourable postoperative outcomes. In the present study, the poor visual acuity distribution within the diabetes group does not prove causation on its own, but it strongly suggests that diabetes is associated with reduced visual recovery among cataract patients with comorbidity burden.

Hypertension also emerged as an important systemic comorbidity in the study. Although it was less frequent than diabetes, it still accounted for a substantial number of poor postoperative visual acuity outcomes. This finding is consistent with the argument that hypertension may affect retinal circulation and ocular vascular stability, thereby reducing the quality of postoperative visual recovery. (Natali Christine, Lusiana Sinurat and Adella) report that hypertension is relevant to visual acuity after phacoemulsification, while (Sa’at et al.

2022) found that multiple comorbid conditions were associated with less favorable visual improvement after cataract surgery. The present findings therefore support the first objective by showing that systemic comorbidities, particularly diabetes and hypertension, are strongly represented among patients with poor postoperative visual acuity and remain clinically important in the assessment of cataract surgery outcomes.

5.4 Objective 2: Influence of ocular comorbidities on postoperative visual acuity

The second objective was to examine the influence of ocular comorbidities on postoperative visual acuity following cataract surgery. The findings show that glaucoma and age-related macular degeneration were associated with particularly poor visual acuity distributions. In the glaucoma group, most participants fell into the poor visual acuity category, while in the AMD group no participant achieved good postoperative visual acuity. These findings are important because they suggest that ocular comorbidities may have a more direct limiting effect on postoperative visual gain than some systemic conditions. This is understandable, since cataract surgery improves media clarity but does not reverse structural damage that already exists in the retina, macula, or optic nerve.

The glaucoma findings are consistent with the literature showing that postoperative visual improvement may be limited where optic nerve damage has already occurred. (Asrani et al. 2024) explain that intraocular pressure and optic nerve vulnerability remain central in glaucoma-related visual loss. (Dhawan et al. 2019) also note that glaucoma is strongly associated with reduced vision-related quality of life, which reflects the long-term consequences of optic nerve impairment. In the present study, the low number of good visual acuity outcomes within the glaucoma group supports the argument that cataract surgery may offer only partial visual benefit when glaucomatous damage is already established. (Chen et al. 2015) further show that cataract surgery has implications for intraocular pressure dynamics in glaucoma patients, which reinforces the need for tailored management in such cases.

The AMD findings are equally important. The absence of good postoperative visual acuity outcomes in this group suggests that age-related macular degeneration may be a major constraint on visual rehabilitation after cataract surgery. This pattern is supported by the literature, which shows that AMD affects the macula, the part of the retina responsible for central visual acuity. (Somasundaran et al. 2020) explain that retinal pigment epithelium dysfunction and photoreceptor damage are central to AMD-related vision loss. (Bakri et al.

2023) and (Marchesi et al. 2024) further show that advanced macular pathology may persist despite treatment of other ocular conditions. The present findings therefore support the second objective by showing that ocular comorbidities, especially glaucoma and AMD, are associated with poor postoperative visual acuity and may place clear limits on the extent of visual improvement that cataract surgery can achieve.

5.5 Objective 3: Management issues associated with patients with comorbidities

The third objective was to identify issues associated with managing patients with comorbidities following cataract surgery. Although the study used record-based quantitative data and did not directly collect patient narratives, the outcome patterns still point to important management concerns. First, the dominance of poor postoperative visual acuity across all comorbidity categories suggests that routine cataract care may not be sufficient for patients with significant systemic or ocular disease. Preoperative assessment, surgical planning, and postoperative monitoring must be adjusted to the patient's comorbidity profile rather than applying the same approach to all cataract cases. (Zambouri .2007) stresses the importance of proper preoperative evaluation in surgical care while (Javed et al. 2023) show that postoperative complications are more effectively addressed when risk factors are recognized early.

A second management issue relates to the coexistence of multiple chronic conditions. The literature suggests that multi-morbidity complicates treatment pathways and may delay recovery because several disease processes act simultaneously. (Nowakowska et al. 2019) show that chronic diseases often cluster rather than occur in isolation. (Sa'at et al. 2022) further demonstrate that multiple comorbid factors reduce the likelihood of optimal visual improvement after phacoemulsification. This is highly relevant to the present study because the participants were older adults attending a provincial hospital, and many of the systemic conditions identified are long-term disorders requiring continuous management. The findings therefore imply that cataract surgery in medically complex patients should be approached as part of integrated chronic disease management rather than as a single isolated procedure.

A third management issue concerns the realistic counseling of patients before and after surgery. Where comorbidities such as glaucoma or AMD are present, the expected visual benefit of cataract surgery may be limited by existing retinal or optic nerve damage. This means that patient expectations must be carefully managed. (Andersson et al. 2020) show that psychological state influences surgical recovery, while (Tan et al. 2022) demonstrate that

outcomes should be understood not only in terms of measured acuity but also in relation to patient-perceived visual functioning and quality of life. In the present study, the high proportion of poor visual outcomes suggests that many patients may require more realistic counseling, closer follow-up, and broader rehabilitation support than would be required in uncomplicated cataract cases.

5.6 Objective 4: Strategies for optimizing visual acuity outcomes

The fourth objective was to explore strategies for optimizing visual acuity outcomes in patients with comorbidities after cataract surgery. The findings suggest that optimization should begin before the operation itself. In diabetic patients, good metabolic control and careful retinal examination are likely to be important because postoperative visual gain may be limited by diabetic retinopathy or macular oedema. (Bin Rakhis et al. 2022) argue that glycemic control is central in diabetes management, while (Mokhtari et al. 2025) show that modern ocular imaging can improve the identification of subtle retinal pathology before intervention. These insights suggest that preoperative optimization should include both systemic stabilization and detailed ocular assessment.

Optimization is also likely to depend on comorbidity-specific surgical and postoperative management. In glaucoma patients, intraocular pressure control and careful surgical handling are important because visual recovery may be affected by optic nerve vulnerability and pressure fluctuations. (Chen et al. 2015) and (Asrani et al. 2024) both emphasize the importance of pressure-related considerations in glaucoma care. In AMD patients, postoperative expectations should be especially cautious because cataract removal cannot reverse established macular degeneration. (Marchesi et al. 2024) and (Somasundaran et al. 2020) support the view that underlying macular pathology continues to shape visual function even where other interventions are performed. The present findings therefore suggest that optimization requires individualized management rather than a one-size-fits-all cataract pathway.

The study also points to the importance of ongoing postoperative monitoring and support. Poor outcomes across the comorbidity groups suggest that follow-up should be particularly close in medically complex patients. (Javed et al. 2023) argue that postoperative complications are better prevented or controlled where monitoring is timely and responsive. (Arevalo-Buitrago et al. 2024) further show that targeted clinical interventions can improve patient care in vulnerable settings. In the context of this study, optimization of visual acuity

outcomes is therefore likely to require coordinated perioperative care, realistic counseling, early detection of complications, and long-term monitoring of both ocular and systemic disease.

5.7 Implications of the study

The findings of this study have practical implications for eye care services at Sekuru Kaguvi EyeHospital and similar settings in Harare. First, they highlight the importance of recognizing comorbidity status as a key part of cataract surgery planning. Patients with diabetes, hypertension, glaucoma, and AMD should not be managed in the same way as uncomplicated cataract patients because their visual prognosis appears less favorable. Second, the study suggests that preoperative assessment should be broadened to include stronger screening for retinal, optic nerve, and systemic disease factors that may reduce postoperative visual gain. Third, the findings support the need for better patient counseling so that individuals with comorbidities understand that cataract surgery may improve vision, but may not fully restore normal visual acuity where irreversible ocular damage already exists.

At a wider level, the study contributes to the understanding of postoperative visual outcomes in a provincial hospital setting in Zimbabwe, where local evidence is often limited. The findings therefore provide a context-specific basis for improving cataract care among patients with chronic disease burden. (Chelak and Chakole 2023) emphasize that health outcomes are shaped by broader social and healthcare conditions, which is particularly relevant in settings where access to specialized follow-up may be uneven. The present study therefore has value not only for ophthalmic practice, but also for service planning, patient education, and clinical prioritization in low-resource environments.

5.8 Limitations of the study

This study has several limitations that should be considered when interpreting the findings. First, it was based on a single hospital and involved 120 patient records, which limits the extent to which the findings can be generalized to other settings. Second, the study was retrospective and relied on the completeness and quality of clinical records. Record-based studies are useful for analyzing existing data, but they are constrained by the accuracy and consistency of what was originally documented. (Babbie 2021) and (Bryman 2021) both note that secondary record review designs are limited by the availability and completeness of recorded information. In this study, incomplete files were excluded, but missing detail may still have affected the depth of analysis.

Another limitation is that the study did not include a comparison group of cataract patients without comorbidities. The results therefore show how postoperative visual acuity was distributed across comorbidity groups, but they do not permit a direct comparison between comorbid and non-comorbid patients. In addition, the follow-up period reflected the data available in the hospital records and may not capture longer-term visual recovery patterns. (Kwedar et al. 2022) suggest that visual recovery trajectories may vary over time, which means that short follow-up can miss later changes in acuity. Finally, the study did not report multivariable statistical modeling, so potential confounding factors such as age, baseline visual acuity, or severity of disease could not be fully disentangled. These limitations do not invalidate the findings, but they mean that the results should be interpreted with appropriate caution.

5.9 Conclusion

This chapter has discussed the findings of the study in relation to the research objectives and the literature. The discussion has shown that systemic comorbidities, especially diabetes and hypertension, were strongly represented among patients with poor postoperative visual acuity, while ocular comorbidities, particularly glaucoma and AMD, appeared to be associated with especially limited visual recovery. The chapter has also shown that the management of cataract patients with comorbidities requires more than routine surgical care, because preoperative assessment, intraoperative caution, postoperative monitoring, and realistic counseling all become more important where chronic disease is present.

Overall, the study suggests that comorbidities play a major role in shaping postoperative visual acuity outcomes after cataract surgery in Harare. The findings therefore reinforce the importance of integrated patient assessment and comorbidity-sensitive cataract care. The next chapter presents the conclusions and recommendations arising from the study.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study examined the impact of comorbidities on visual acuity outcomes after cataract surgery at Parerenyatwa Hospital in Harare using a quantitative retrospective hospital-based record review**.** The study showed that postoperative visual outcomes were not uniform across patients with comorbidities. Poor visual acuity was the most common postoperative outcome in the sample, and this pattern was evident across all comorbidity groups.

The findings further showed that diabetes was the most prevalent comorbidity among the participants, followed by hypertension**,** glaucoma**,** and age-related macular degeneration**.** Although diabetes and hypertension were the most frequent conditions, the results also indicated that glaucoma and AMD were associated with particularly poor visual outcomes**,** with AMD showing no cases of good postoperative visual acuity in the study sample. This suggests that both systemic and ocular comorbidities play an important role in shaping recovery after cataract surgery, although their influence may differ in severity and mechanism.

Taken together, the study confirms that cataract surgery outcomes should not be understood in isolation from the patient's broader clinical condition. The findings suggest that the presence of comorbidities can reduce the extent of visual improvement achieved after surgery and may complicate postoperative recovery. The study therefore contributes local evidence from Harare that comorbidity-sensitive cataract care is necessary if better visual outcomes are to be achieved.

6.2 Recommendations

Based on the findings of this study, several recommendations are proposed. First, comprehensive preoperative screening should be strengthened for cataract patients, with particular attention to diabetes, hypertension, glaucoma, and AMD. This is important because the study showed that poor postoperative visual acuity was common among patients with these comorbidities.

Second, patients with diabetes and hypertension should receive stronger systemic disease control before surgery**.** Since diabetes was the most common comorbidity and hypertension

was also highly represented, improved coordination between eye care services and general medical care may help reduce avoidable postoperative visual impairment.

Third, patients with glaucoma and AMD should receive careful preoperative counseling on expected visual outcomes. The findings suggest that these ocular comorbidities may substantially limit visual recovery even when surgery is completed successfully. Clear counseling may therefore help improve treatment planning and realistic expectations.

Fourth, postoperative follow-up should be more targeted in patients with comorbidities**.** Patients with high-risk conditions should be monitored more closely for delayed recovery or poor visual improvement so that complications can be identified and managed early.

6.3 Implementation of Recommendations

Implementation of these recommendations requires collaboration between ophthalmic services, general healthcare providers, and community health stakeholders. At hospital level, standard preoperative assessment protocols should include clearer screening for systemic and ocular comorbidities. Referral systems between eye units and chronic disease clinics should also be strengthened so that cataract patients with diabetes or hypertension are better stabilized before surgery.

At community level, awareness programs should emphasize the importance of early eye examination for people living with chronic conditions. Such efforts may improve timely presentation, earlier diagnosis of vision-threatening comorbidities, and more realistic use of cataract services. In this way, the study's recommendations can support improved patient care and better visual outcomes among cataract patients in Harare.

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6.4APPENDICES

QUESTIONNAIRE FOR CATARACT PATIENTS

Demographics

1. Age

……

2. Gender

- Male
- Female

3. Occupation

……

4. Level of Education

- no formal education
- secondary
- tertiary

5. Do you wear glasses?

- Yes
- No

Medical history

6. Do you have any of the following conditions?

- Diabetes
- Hypertension
- Glaucoma
- Age-related macular degeneration (AMD)
- Other systematic or ocular
- No known comorbidities

7. Duration of the morbidity (years)

……..

8. Are you on medication for any of the above conditions?

……

Cataract surgery details

9. Which eye was operated?

- Right
- Left
- Both

10. Type of intraocular lens (IOL) implanted (if known)

- Monofocal
- Multifocal
- Toric
- Not sure

11. Did you experience any complications during or after surgery?

Yes (specify……)

Visual acuity

12. Preoperative VA (BCVA)

(OD…….;…….OS)

13. Postoperative VA

A. One week

(OD…….;…….OS)

B.3 months

(OD…….;……..OS)

Patient-Report and Satisfaction

14. How would you rate your vision improvement after surgery?

- Significantly improved
- Slightly improved
- No change

- Worse than before

15. Do you experience any of the following?

- Blurred vision
- Glare or halos
- Dry eyes
- Eye discomfort
- No issues

16. Do you feel your comorbidities affected your recovery or vision improvement?

- No

Yes (specify.....)