FACTORS ASSOCIATED WITH THE OUTCOME OF CATARACT SURGERY AT UNIVERSITY TEACHING HOSPITALs-EYE HOSPITAL IN LUSAKA, ZAMBIA

A dissertation submitted to the University of Zambia in partial fulfillment of award of Master of Medicine-Ophthalmology

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DECLARATION

This dissertation is my original work and has not previously been submitted for any qualification at this or another university.

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APPROVAL

This dissertation by Dr Fatima Umerji is approved as partial fulfilment of the requirement for the award of the Master of Medicine in Ophthalmology Degree of the University of Zambia.

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ACKNOWLEDGEMENTS

I thank God Almighty for his many favours and blessings throughout my study.

I also wish to express my appreciation to my supervisors Professor Ichengelo Muma, Dr Munachonga Mutoloki and Dr Zipporah Phiri for their invaluable contribution and guidance in this research.

My sincere thanks to Dr Grace Mutati at the University Teaching Hospitals-Eye Hospital for her continued support and allowing me to conduct this research at the hospital.

My gratitude goes to all the Ophthalmologists, fellow students and the staff of the University Teaching Hospitals-Eye Hospital for keeping me motivated.

My family for their encouragement and love thorough out the study period.

ABSTRACT

Cataract is a major cause of blindness universally. The 2012 report from the World Health Organization stated that cataract was accountable for 50% of avoidable blindness in sub-Saharan Africa.

The objective of this study was to determine the factors associated with the outcome of cataract surgery at UTHs-Eye Hospital in Lusaka Zambia.

A hospital based quantitative cross-sectional study was done on 197 patients who under-went cataract surgery at the UTHs Eye Hospital from May 2019 to November 2019. Data was collected using a well-organized data extraction sheet that consisted of variables concerning demographic data, preoperative information, surgical techniques, intra-operative complications and postoperative findings. The postoperative evaluations were done at day one, week two and week six. Post-operative visual acuity at six weeks was transformed into a dichotomous variable with borderline and poor outcomes as one and good outcomes as other. Data was analyzed using univariate and multivariate logistic regression analysis.

The mean age was 65 (SD 15.15) years old and 118 patients (59.9%) were males. Ninety-six patients (48.7%) had systemic co-morbidities and 50 (25.5%) patients had an ocular pathology. Intra-operative complications were seen in 45 (22.8%) patients. Immediate post-operative complications were seen in 56 (28.4%) patients while late post-operative complications were present in 16 (12.8%). A good outcome was seen in 75.2% of patients based on best-corrected visual acuity (BCVA), 15.2% had an intermediate outcome and 9.6 % had a poor outcome at six weeks follow up.

Using multivariable analysis, poor visual outcomes were significantly higher in patients with ocular pathology (OR 3.3; 95% CI 1.64, 6.60), intraoperative complications (OR 3.7; 95% CI 1.87, 7.42), those with immediate post-operative complications (odds ratio 2; 95% CI 1.04, 3.66), and late post-operative complications (OR 5.8; 95% CI 2.19, 13.84).

This study showed that monitoring visual outcomes and working on reducing intra-operative and post-operative complications can significantly improve the outcome of cataract surgery.

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ACRONYMS AND ABBREVIATIONS

AC	Anterior chamber
AC IOL	Anterior Chamber Intraocular Lens
ARMD	Age Related Macular Degeneration
BCVA	Best Corrected Visual Acuity
CSO	Cataract Surgical Outcomes
ECCE	Extra Capsular Cataract Extraction
ERES	Excellence in Research Ethics and science
DM	Diabetes Mellitus
IOL	Intraocular Lens
IOP	Intraocular Pressure
LMIC	Low and Middle-Income countries
MSICS	Manual Small Incision Cataract Surgery
PC IOL	Posterior Chamber Intraocular Lens
PC	Posterior Capsule
PHACO	Phacoemulsification
RAAB	Rapid Assessment of Avoidable Blindness
RACSS	Rapid Assessment of Cataract Surgical Services
SPSS	Statistical Package for Social Scientists
UCVA	Uncorrected Visual Acuity
UTHs	University Teaching Hospitals
VA	Visual Acuity
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Background

A Cataract is defined as a clouding of the crystalline lens of the eye which impedes the passage of light (WHO, 2010). It is the leading cause of preventable blindness and low vision worldwide accounting for nearly 51% of all world blindness, with an estimated 19.9 million people blind from the disease worldwide (Pascolini and Mariotti, 2012). In 2010, one in three blind people was blind due to cataract, and one of six visually impaired people was visually impaired due to cataract (Khairallah et al., 2015). Cataract was the main cause of blindness (39.8%) from the Rapid Assessment of Avoidable Blindness study (RAAB) conducted by Lindfield et al (2012) in Southern Zambia. A more recent RAAB report done in 2017 in Muchinga province by Ministry of Health Zambia showed that 55% of the causes of avoidable blindness was due to cataract.

Bowling (2019) classifies cataract as either congenital, developmental or acquired. Acquired cataract can be classified further as age-related cataract, secondary cataract and cataract associated with systemic diseases. Some of the systemic diseases associated with cataract include diabetes mellitus, myotonic dystrophy, atopic dermatitis and neurofibromatosis. Secondary (complicated) cataract develops as a result of some other primary ocular disease commonly chronic anterior uveitis, acute congestive angle-closure, high myopia and hereditary fundus dystrophies. Systemic medications for example steroids, are also associated with cataracts. The risk factors for cataract development include sex, systemic diseases such as diabetes mellitus, exposure to excessive sunlight, lifestyle, eye injury and use of steroids (The Royal College of Ophthalmologists, 2010).

There are no known preventive strategies for cataract and the mainstay of treatment is cataract surgery which is the removal of the opacified crystalline lens and insertion of a synthetic intraocular (IOL) lens (Basti et al.,1993). It is one of the most common surgical procedures performed worldwide and the numbers are on the rise. It has been shown to be one of the most cost-effective surgical interventions (Lindfield et al., 2012).

Cataract surgery aims to rehabilitate blind or visually impaired persons by restoring their eye sight so that their quality of life and ability to function are returned to normal (WHO, 1998). The common type of cataract surgery techniques performed include Manual small incision cataract surgery (MSICS) and Phacoemulsification (Phaco). Manual small incision cataract surgery is a variant of Extra capsular cataract extraction (ECCE) used to address the requirements for high volume surgical output of dense cataracts in less affluent geographical regions. Phaco is the standard method of cataract extraction in developed countries (Bowling, 2019).

Complications of cataract surgery can be intraoperative, early post-operative or late post-operative complications which occur after 6 weeks. Intra operative complications include premature entry, iris prolapse, descement membrane peeling, iridodialysis, posterior capsule tear which can be accompanied by vitreous loss, posterior migration of lens material and rarely expulsive hemorrhage (Bowling,2019). Sequelae of intraoperative complications if inappropriately managed include early postoperative complications like corneal oedema, wound leak and hyphema. Late post-operative complications include cystoid macular oedema, retinal detachment, endophthalmitis, up drawn pupil, uveitis and posterior capsule opacification (Bowling, 2019). From the paper by Yorston (2008) on Cataract complications, it was reported that complications following cataract surgery represented a significant obstacle to the success of any blindness prevention programme. At a conservative estimate, at least 25% (or 1.5 million) of the six million cataract operations performed annually in developing countries have poor outcomes and about one quarter of these poor outcomes are due to surgical complications. Over 375,000 people can therefore suffer permanent visual impairment every year as a result of surgical complications.

There are many ways of measuring clinical outcome after cataract surgery. These include visual acuity, contrast sensitivity, complication rates, among others. Unlike other health conditions, clinical outcomes, such as visual acuity, in cataract surgery, are relatively simple to measure. They are easily quantified and can be used to show pre- and postoperative changes. It is also critical to collect information about intra-operative complications because a high complication rate can be associated with poor surgical technique or patient management (Sonron et al., 2015).

1.2 Statement of the problem

Cataract surgery is the most common surgery done at UTHs Eye Hospital. Five hundred and thirty-three cataract surgeries were done (29% of all surgeries done) in 2017 (UTHs Eye hospital 2017 annual report). Despite it being the most common surgery performed, there is no information about the outcome and the factors that may influence the outcome of the cataract surgery.

WHO recommends that less than 5% patients should have poor outcome (With Best corrected visual acuity <6/60), which was found to be suboptimal in sub Saharan Africa according to studies, 30% in southern Zambia (Lindfield et al., 2012). In a resource limited setting such as Zambia it is important to find out the outcome of cataract surgery so as to prevent poor outcome and also to address current cataract surgery management protocols if possible.

1.3 Justification of study

Information obtained in this study can used to institute the basis for a prospective monitoring of outcome of cataract surgery at UTHs Eye Hospital. It would be useful in patient selection for cataract surgery and this would help to reduce the rate of surgical complications. It would also assess the cataract surgery complications which occur at our Eye hospital and this can help in proper surgical management as well as improving our practice and surgical techniques if need be. The information from this study can also be used in promoting cataract surgery to the community, for example a good outcome would encourage more people to come for cataract surgery to the Eye Hospital.

1.4 Research question

What factors are associated with the outcome of cataract surgery at University Teaching Hospitals-Eye Hospital in Lusaka?

1.5 Study objectives

1.5.1 Broad objectives:

1. To determine the factors associated with the outcome of cataract surgery at UTHs-Eye Hospital.

1.5.2 Specific objectives

1. To assess the visual outcome of cataract surgeries at UTHs-Eye Hospital.
2. To establish patient related factors (age, sex, ocular comorbidities) which can affect the outcome of cataract surgeries at UTHs-Eye Hospital.
3. To determine the surgical, intra operative and post-operative complications of cataract surgery which can affect the outcome cataract surgeries at UTHs-Eye Hospital.

CHAPTER TWO: LITERATURE REVIEW

Cataract surgery visual outcome can be used as an indicator to measure performance so as to monitor the quality of cataract services (Sonron et al., 2015.). There are two methods of measuring outcome of cataract surgery; using a clinical indicator such as visual acuity or contrast sensitivity, or using a patient report of function or quality of life (or other types of subjective outcome) (Lindfield et al., 2012). In its guidelines, the World Health Organization (WHO) recommends that all patients undergoing cataract surgery should have visual acuity measured in each eye preoperatively, and anytime between discharge and 12 weeks (WHO, 1998).

Visual outcome can be assessed with full spectacle correction (BCVA) or with available correction (functioning vision). Good outcome is defined as 6/6–6/18 (available and best correction grades = >85% and >90% respectively), borderline outcome as <6/18–6/60(available and best correction =<15% and <5% respectively), and poor outcome as <6/60 (available and best correction =<5% for each type) (WHO, 2008). There is evidence that the cataract surgical outcomes (CSOs) in many Low and Middle-Income Countries (LMIC'S) are suboptimal as shown from various studies in table 1 below (Lindfield et al., 2012).

Table 2.1: Percentage of poor outcome (Best corrected visual acuity<6/60) in LMIC following cataract surgery (Lindfield et al., 2012)

COUNTRY	REGION	YEAR OF PUBLICATION	PERCENTAGE WITH POOR OUTCOME
Eritrea	All	2011	19
Malawi	Southern	2011	28
Tanzania	Kilimanjaro	2010	17
Kenya	Nakuru	2007	17
Rwanda	Western province	2007	22
Cameroon	Limbe	2010	44
China	Gao 'an Xingang Wan'zai	2007 2010	44 13 3
Zambia	Southern province	2012	30

The World Health Organization (WHO) recommends that less than 5% of patients should have a visual outcome of worse than 6/60 with best correction. Table 2.1 shows that visual outcomes in many countries failed to reach this level (Lindfield et al.,2012). The proportion of good visual outcomes following cataract surgery was higher in Latin America and the Caribbean than in Sub-Saharan Africa (63.0% vs. 43.1%, respectively) (Wang et al., 2017).

From the RAAB study from southern Zambia by Lindfield et al (2012) which had surveyed 113 eyes that received cataract surgery at any time in the past showed that the outcome of cataract surgery was suboptimal with over 30% of surgeries having a poor outcome despite an intra ocular lens being inserted. The main causes of poor outcome were co-morbidities like glaucoma or posterior segment disease and surgical complications. These results are similar to previous studies in sub-Saharan Africa (including the survey in Malawi) and emphasize the importance of monitoring outcome and ongoing assessment of the quality of the services provided (Lindfield et al.,2012).

There are various factors which can affect the visual outcome cataract surgery such as co-existing ocular pathologies, surgical complications, uncorrected refractive error and post-operative complications (Cook, 2000). Case Selection is important because the visual outcome in eyes with co-existing pathology is likely to be poor. Diseases such as chronic glaucoma, age-

related macular degeneration and diabetic retinopathy may be co-exist with cataract, and will result in a poor outcome following cataract surgery. It would be good to operate on eyes with no co-existing pathology, however cataract surgery often needs to be carried out on eyes that have significant other pathology and this can result in a poor outcome (Sonron et al.,2015).

Poor visual outcome can be due to patient-related factors and/or service-related factors. Patient related factors include pre-operative morbidity other than cataract surgery resulting in poor vision despite good surgery. Service related factors include intra operative complications and post-operative uncorrected visual acuity (Sonron et al., 2015). Intra operative and Post-Operative Complications also affects the outcome of cataract surgery. These complications may be early or late. Persistent inflammation in the early post-operative period and posterior capsule opacification in the late post-operative period may result in a poor outcome. Uncorrected refractive error can cause significant astigmatism or ametropia which results in a poor outcome. Whilst the implantation of a standard power intraocular lens is acceptable practice in some field situations, bio-metry and the implantation of a customized intraocular lens power can improve the visual outcome (Cook, 2000).

In a study done by Matta et al (2019), factors associated with poor outcomes were age more than 70 years old, female gender, those with preoperative comorbidities, intraoperative complications, eyes that underwent no IOL or anterior chamber-IOL and those undergoing extracapsular cataract extraction. According to Yorston (2008), poor vision after cataract surgery is caused by failure to detect pre-existing eye conditions, such as macular degeneration or amblyopia (selection), inadequate correction of post-operative refractive error (lack of spectacles) or surgical complications (surgery) as shown in Table 2.2. Problems of selection can be addressed by careful pre-operative evaluation, which should reduce the number of poor results due to the presence of other eye diseases. This will help to prevent complications.

Table 2.2: Causes of poor outcome (Presenting vision <6/60) (Yorston,2008)

Country	**Percentage of total number of operations leading to a poor outcome**	**Cause of poor outcomes (%)**		
		Post-operative refractive error	**Poor Patient Selection**	**Surgical Complications**
Bangladesh	28%	37%	41%	22%
Kenya	22%	34%	36%	30%
Pakistan	34%	36%	39%	25%

In a study done by Sonron et al (2015), it was found that the odds of a poor outcome increase from borderline to poor preoperative VA. This is consistent with the International Cataract Surgery Outcomes Study, where poor preoperative VA is highlighted as one of the predictors of a poor visual outcome (Norregaard, 2007). The most important surgical complications that affect the visual outcome are posterior capsular rupture and vitreous loss, which is relatively common. These complications may occur in about 6% of cataract surgeries cases in the developing world compared to about 4% in developed countries (Yorston, 2008). Multiple investigators have studied rates of intraoperative and postoperative complications among cataract surgeries performed by resident surgeons. Retrospective chart reviews of resident cataract surgeries (the majority of which were phacoemulsifications) performed at 13 different residency training programmes, with sample sizes ranging from 102 to 1442 patients, reported rates of posterior capsule rupture of 1.8% to 11.2% (Stein, 2012). In peer- reviewed literature the incidence of intra operative complications ranges between 2% and 14.7%, with posterior capsule tear and vitreous loss vary between less than 1% to 4.1 % in most institutions in the United Kingdom (Franzco et al., 2010).

Venkatesh et al. (2005) did a study on high volume cataract surgeries in India, which showed that 51% of eyes had uncorrected visual outcome (UCVA) of <6/18 to 6/60 and 5.3% had a UCVA of <6/60. However, 94.4% achieved a best corrected visual acuity (BCVA) of 6/18 and better. The difference between UCVA and BCVA brings out the fact that residual refractive error is a major deterrent to successful outcomes and this has been shown to be true in several studies.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Study Site

The study took place at UTHs Eye Hospital in Lusaka Zambia which is a is a tertiary referral center for all eye patients in Zambia. It is also a training site for undergraduate medical students' nurses and ophthalmologists.

3.2 Study Design

A hospital based cross-sectional survey was done among patients who under-went cataract surgery at the UTHs Eye Hospital from May 2019 to November 2019.

3.3 Study Population

All patients above 18 years' old who had cataract surgery at the UTHs Eye Hospital.

3.4 Selection of participants

3.4.1 Inclusion Criteria

All adult patients above 18 with operable cataracts were selected.

3.4.2 Exclusion Criteria

Patients who had cosmetic cataract surgery and those with traumatic cataracts were excluded from the study.

Patients who had combined surgeries like Trabeculectomy with cataract were also excluded from this study.

3.5 Sampling

3.5.1 Sample Size

Sample size calculation was done using the following sample size formula for finite (small) population (Lwanga SK and Lameshow S, 1991)

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1)+Z^2P(1-P)}$$

n' = sample size with finite population correction,

N = size of the target population = 534 (number of cataract surgery done at UTH EYE hospital in year 2017 from hospital registry)

Z = statistic for 95% level of confidence equal to 1.96

P = estimated outcome of cataract- 30.1% (from RAAB study in southern Zambia)

Where n' = **197 cataract surgeries**

So total = **197 cataract surgeries**

3.5.2 Sampling Technique

Convenient as well as purposive sampling technique was used. Patients were recruited from the Eye hospital clinics. Enrollment was determined by the inclusion/exclusion criteria**.**

3.6 Data collection plan

Data was collected using a well-organized data extraction sheet that consisted of demographic data, preoperative information, surgical techniques, intra-operative complications and postoperative findings. The pre-operative evaluations were done at UTHs Eye hospital 1 day before cataract surgery. This included Visual acuity using Snellen's chart. Intra ocular pressure, anterior segment slit lamp examination, dilated fundus examination/ B-scan and biometry (keratometry and A-scan).

The surgical procedure for all eligible study participants were done by ophthalmologists and ophthalmology residents in the theatre the following day. Surgical information included surgical techniques, intraocular lens position, intra ocular lens type used and intraoperative complications. The postoperative evaluations were done at day one, week two and week six.

Post-operative examination included best corrected visual acuity, anterior and posterior slit lamp examination and post-operative complications.

3.7 Study Variables

A. Independent variables

Variable	**Measurement scale**
Age	Continuous
Sex	Binary
Surgeon	Binary
Ocular comorbidities	Categorical
Intra operative complications	Categorical
Immediate post-operative complications	Categorical
Late post-operative complications	Categorical

B. Dependent variables

Variable	**Measurement scale**
Visual outcome	Categorical

3.8 Data analysis

Data entry was done in excel and analysis was done using Stata Version 14. All descriptive data was summarized in charts, tables and graphs. The outcome variable of interest was Best Corrected Visual Acuity at week six post-surgery. This variable was transformed into a dichotomous variable (Good and Poor). Good outcome was defined as a BCVA of 6/6-6/18 and poor outcome (BCVA of <6/18-6/60 and <6/60). Univariate logistic regression analysis was conducted to explore association of the co-variates and the dependent variable. The variables that were significant (chi square, $p<0.05$) were then included in forward step-wise multivariate logistic regression.

3.9 Ethical Consideration

Ethical clearance was obtained from Excellence in Research Ethics and Science (ERES) Converge. The purpose of this study was explained to the patient in their own language and the information sheet was being translated into local language the patient understands. This information is found in the participant's information sheet. Informed consent was obtained from the participants. A coding system was used to ensure confidentiality of all patient details, and ensuring all data was captured for each patient at every visit.

CHAPTER FOUR: RESULTS

4.1 Demographic data

Table 4.1 shows the demographic characteristics of the patients. The study targeted 197 eyes from May 2019 to November 2019 at University Teaching Hospitals-Eye Hospital. The mean age was 65 (SD 15.15) years old with majority of patients being above 65 years' age (61.5%). Male patients who underwent cataract surgery were 118 (59.9%) while females were 79 (40.1%).

Table 4.1: Demographic characteristics of the participants (n=197 eyes)

Variable	Category	Frequency	Percent (%)
Sex			
	Male	118	59.9
	Female	79	40.1
Age			
	< 40	14	7.1
	40 to 65	68	34.5
	>65	115	61.5

Mean age: 65 years old (SD 15.15)

4.2 Pre-operative evaluation

Table 4.2 shows that 101 patients (51.3%) had no systemic comorbidities. Ninety-six patients (48.7%) had systemic comorbidities with hypertension being the highest (26.4%), followed by diabetes (14.7%).

Table 4.2: Systemic Comorbidities (n=197 eyes)

Pathology	Frequency	Percent (%)
None	101	51.3
Hypertension	52	26.4
Diabetes	29	14.7
Hypertension and Diabetes	9	4.6
Retro viral disease	6	3.1

As shown in table 4.3 ocular pathologies were present in 50 (25.5%) of patients with glaucoma being the most common ocular pathology (15.74%). Some of the ocular comorbidities were found pre operatively and some were found post operatively.

Table 4.3: Ocular pathologies (n= 197 eyes)

Pathology	Frequency	Percent (%)
None	147	74.61
Glaucoma	31	15.74
Old iritis	6	3.05
Pseudo exfoliation	5	2.54
Age related macular degeneration	3	1.52
Optic atrophy	2	1.02
Corneal scar	2	1.02
Macular scar	1	0.51

4.3 Surgical information

The surgical information is outlined in table 4.4 below. MSICS was performed on most patients (98.5%) and a PC IOL was put in 94.9% of patients. 4.6% patients were left aphakic and 1 eye (0.5%) had an anterior chamber lens. Ophthalmologists performed 156 (79.2 %) of the surgeries and 41(20.8%) were done by residents.

Table 4.4: Surgical information of the patients (n=197)

Variable	Category	Frequency	Percent (%)
Surgical technique			
	MSICS	194	98.5
	Phacoemulsification	3	1.5
Intra ocular lens			
	PC IOL	187	94.9
	AC IOL	1	0.5
	Aphakic	9	4.6
Surgeon			
	Ophthalmologist	156	79.2
	Resident	41	20.8

4.4 Intra-operative complications

As shown in Table 4.5, majority of the patients (77.16%) had no intra-operative complications. The frequency of intra operative complications was seen in 45 eyes (22.8%) with posterior capsule tear with vitreous loss being the most common seen in 13 eyes (6.6%). 142 eyes (77.16%) did not have any intra-operative complications.

Table 4.5: Intraoperative complications (n=197 eyes)

Condition	Frequency	Percent (%)
None	152	77.16
Posterior capsule tear with vitreous loss	13	6.60
Premature corneal entry	9	4.57
Iris prolapse	7	3.55
Posterior capsule tear no vitreous loss	7	3.55
Button hole of cornea	2	1.02
Endothelial damage	2	1.02
Descemet's membrane detachment	2	1.02
Iridodialysis	1	0.51
Zonular Dehiscence	1	0.51
Nucleus drop	1	0.51

4.5 Post-operative complications

Table 4.6 shows immediate post-operative complications which were seen in 56 eyes (28.43%). Corneal oedema was most prevalent in 33 eyes (16.75%). Acute endophthalmitis was found in 1 patient (0.51%).

Table 4.6: Immediate post-operative complications < 4 weeks (n=197)

Condition	Frequency	Percent (%)
None	141	71.57
Corneal oedema[1]	33	16.75
Striate keratopathy [1]	6	3.05
Retained lens matter [2]	6	3.05
Corneal oedema and Striate keratopathy [1]	4	2.03
Hyphema[1]	2	1.02
Malposition of Intraocular lens [3]	2	1.02
Iris prolapse [4]	1	0.51
Acute Endophthalmitis [5]	1	0.51
Vitreous in Anterior chamber [6]	1	0.51

[1] Managed conservatively with topical medication

[2] Cortex washout done

[3] IOL re-dialing done

[4] Wound closure done

[5] Intravitreal antibiotics given then eventually evisceration

[6]Anterior vitrectomy done

4.6 Late post-operative complications

Table 4.7 outlines that most of the patients had no late post-operative complications (87. 2%).Late post-operative complications at 6 weeks were seen in 16 eyes (12.8%) with Posterior capsule opacification (PCO) being the highest (4%).

Table 4.7: Late post-operative complications at 6 weeks (n=125)

Condition	Frequency	Percent(%)
None	109	87.2
Posterior capsule opacification	5	4.0
Malpositioning of IOL	3	2.4
Pseudophakic bullous keratopathy	3	2.4
Cystoid macular oedema	3	2.4
IOL drop	2	1.6

4.7 Visual outcome of cataract surgery

Table 4.8 outlines the pre-operative visual acuity and visual outcome of cataract surgeries at different follow-up visits. All of the 197 patients operated had a poor pre-operative VA of less than 6/60. At 6 weeks' follow-up visit, based on UCVA, 62.4% had good outcome and based on BCVA, 75.2% had good outcome. Based on UCVA and BCVA, those with less than 6/60 were only 12% and 9.6% respectively. Twenty one (10.7%) patients missed week 2 follow up review and 72 (34%) patients did not come at week 6 review.

Table 4.8: Visual outcome of cataract surgery

Visual acuity categories	Pre-operative N=197	Post-operative day 1 N=197		Post-operative week 2 N=176		Post-operative week 6 N=125	
	VA	UCVA	BCVA	UCVA	BCVA	UCVA	BCVA
6/18 or better (good)		62 (31.5)	134 (68)	86 (48.9)	124 (70.5)	78 (62.4)	94 (75.2)
<6/18-6/60 (intermediate)		91 (46.2)	42 (21.3)	66 (37.5)	33 (18.8)	32 (25.6)	19 (15.2)
<6/60 (poor)	197 (100)	44 (22.3)	21 (10.7)	24 (13.6)	19 (10.8)	15 (12)	12 (9.6)

4.8 Comparison of the visual outcome over 6 weeks

Figure 4.1 compares visual outcome at day one, week two and week six. There is improvement of vision (BCVA) from 68% at day one to 75% at week six follow up. Intermediate outcome was seen in 21% of patients and poor outcome was seen in 11% at week one. At six weeks intermediate VA was seen in 15% and poor VA was found in 10% of eyes.

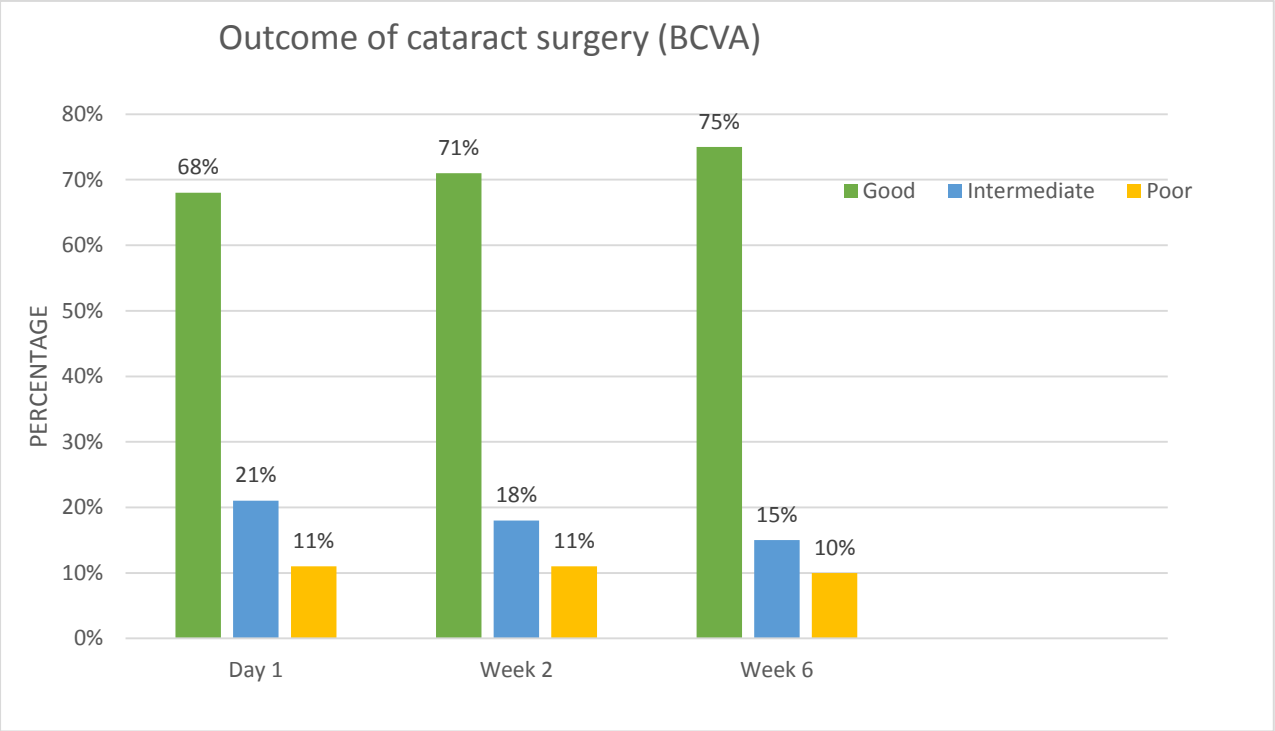

Figure 4.1: Visual outcome of cataract surgery (BCVA)

Good outcome: 6/6-6/18

Intermediate outcome: 6/18-6/60

Poor outcome: < 6/60

Figure 4.2 compares the visual outcome at week six (UCVA and BCVA). There is significant improvement in vision from 62% to 75% with best available correction for patients who had a good visual outcome.

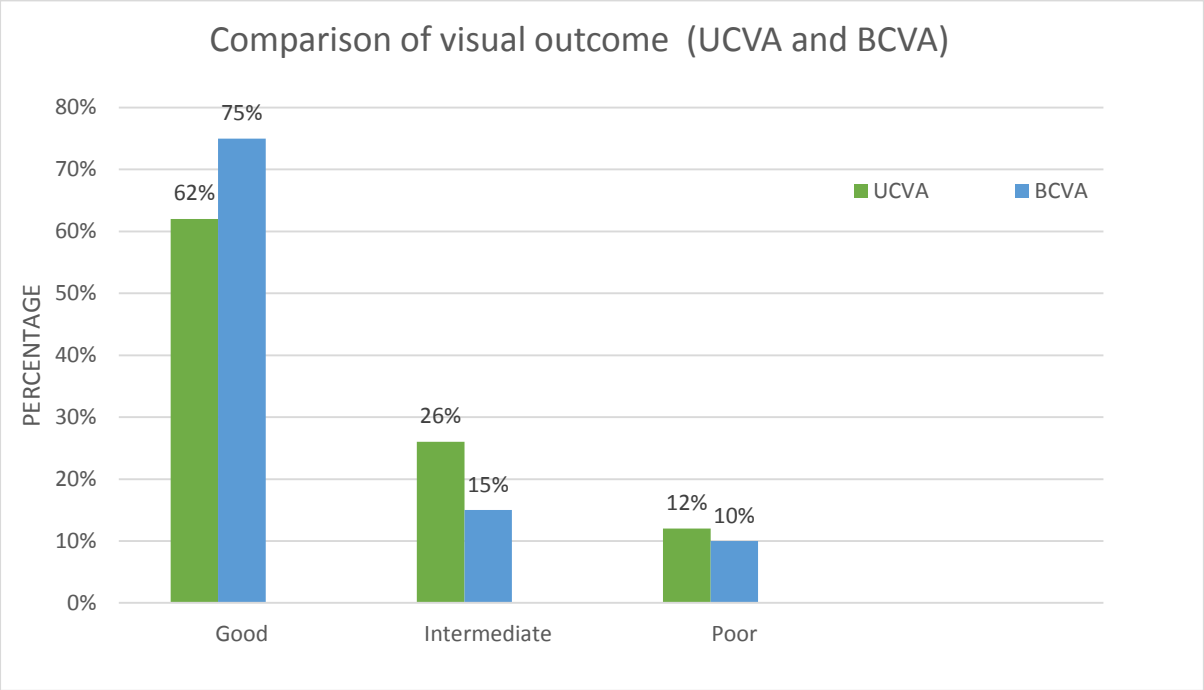

Figure 4.2: Comparison of visual outcome (UCVA and BCVA)

Good outcome: 6/6-6/18

Intermediate outcome: 6/18-6/60

Poor outcome: < 6/60

4.9 Factors associated with visual outcome at six weeks

Visual outcome at six weeks follow up was used for further statistical analysis. Table 4.9 shows the univariate analysis of those with good outcome (BCVA 6/6-6/18) versus poor outcome (BCVA <6/18). Univariate logistic regression found the following 5 clinical variables statistically significant ($p < 0.05$); Ocular pathology (OR 4.2; 95% CI 1.77-10.0), intraoperative complications (OR 7.4; 95% CI (2.99-18.34)), immediate post-operative complications (OR 3.54; 95% CI (1.52-8.25)), Surgeon (OR 2.68 CI (1.08-6.67) and those with late post-operative complications (OR 37.9;95% CI (7.88-181.9). The odds of having a poor outcome was higher in males (OR 1.62; CI (0.69-3.83) but this was not statistically significant (p=0.26). Age did not have statistically significant association with visual outcome (p=0.92). Systemic comorbidities did not have a statistically significant association with visual outcome (p=0.89).

Table 4.9: Univariate analysis of visual outcome at 6 weeks

Variable N=125	6/6-6/18 (Good outcome) N=94	>6/18 (Poor outcome) N=31	P-value	Odds ratio	95% Confidence interval
Age in years					
< 40	8 (72.7)	3 (27.3)	P=0.92	1.3	0.28-5.73
40-65	34 (77.3)	10 (22.7)			Reference
>65	52 (74.3)	18 (25.7)		1.2	0.48-2.9
Gender					
Male	53 (71.6)	21 (28.4)	P=0.26	1.62	0.69-3.83
Female	41 (80.4)	10 (19.6)			
Systemic Comorbidities					
No	47 (75.8)	15(24.2)	P=0.89	1.07	0.47-2.4
Yes	47 (74.6)	16 (25.3)			
Ocular pathology					
No	75 (83.3)	15(16.7)	P<0.001	4.2	1.77-10.0
Yes	19 (54.3)	16 (45.7)			
Surgeon					
Ophthalmologist	78 (79.6)	20 (20.4)	P=0.03	2.68	1.08-6.67
Registrar	16 (59.3)	11(40.7)			
Intra-operative complications					
No	79 (86.8)	12(13.2)	P<0.001	7.4	2.99-18.34
Yes	16 (47.1)	18(52.9)			
Immediate Post-operative complications					
No	70 (83.3)	14 (16.7)	P=0.0026	3.54	1.52-8.25
Yes	24 (58.5)	17 (41.5)			
Late Post-Operative Complications					
No	92 (84.4)	17 (15.6)	P<0.001	37.9	7.88-181.9
Yes	2 (12.5)	14 (87.5)			

4.10 Multivariate analysis

Multivariate logistic regression showed that the factors which were significantly associated with poor outcome were presence of ocular pathology, presence of intra operative complications, immediate and late post-operative complications. Those with ocular pathology had three fold increased odds of having a poor outcome. Presence of intra-operative complications increased the odds of having a poor outcome by 3.7. Patients were twice as likely to have a poor outcome if they had immediate Post-operative complications and almost 6 times likely to have a poor visual outcome if they had late post-operative complications.

Table 4.10: Multivariate Analysis of factors influencing visual outcome

Variable	OR (95% CI)	P-Value
Ocular pathology	3.3 (1.64-6.60)	0.001
Surgeon	1.8 (0.96-3.41)	0.067
Intra-operative complications	3.7 (1.87-7.42)	0.000
Immediate Post-operative complications	2.0 (1.04-3.66)	0.038
Late Post-operative complications	5.8 (2.19-13.84)	0.000
Constant	0.013 (0.03-0.06)	0.000

4.11 Loss to follow up

36.5 % of the patients were lost to follow up at 6 weeks. Patients who were likely to come for review were those that had intra–operative complications and those with post-operative complications, although the difference was not significant as shown in table 4.11.

Table 4.11: Analysis of patients who were lost to follow up at 6 week

Variable	Available (n=125)	Not available (n=72)	P- value
Ocular pathology	Yes: 35 (28)	15(20.8)	0.27
	No : 90(72)	57(79.2)	
Intra operative Complications	Yes :34(27.2)	11(15.2)	0.06
	No: 91(72.8)	61(84.8)	
Post-operative complications	Yes: 41(32.8)	15(20.8)	0.07
	No: 84(67.2)	57(79.2)	

CHAPTER FIVE: DISCUSSION

This cross-sectional study focused on the visual outcome of cataract surgery and the factors associated with the outcome. Based on the findings, 75.2% had a good visual outcome, 15.6% had an intermediate outcome and 9.6% had a poor outcome. These findings are encouraging but still fell slightly below WHO recommendations of 85%. These findings are higher than what was found in a similar study in Ghana where 71% had a good visual outcome (Mensah, 2019). Another study in Ethiopia found only 26.6% had attained good outcome after cataract surgery (Hussen et al.,2017). The reports on outcome of cataract surgeries done in Africa are not very encouraging (Oderinlo et al.,2017: Lindfield et al.,2012). One of the reasons for this could be because most of the earlier studies are done using extracapsular cataract extraction technique (ECCE) while our study was mostly done using MSICS. The outcome of MSICS have been known to be better than ECCE in most studies (Venkatesh et al., 2005). Population based studies in Sub Saharan Africa show that the proportion of good outcome ranges from 23% to 70% all of which fall below WHO target that > 85% should achieve BCVA< 6/18 (Bastawrus et al.,2013). Yorston has suggested in his articles of cataract surgery outcomes in Africa that patients have lower outcomes compared to developed countries due to deficiency in primary eye care so patient present late with complex cataracts and other unknown underlying systemic and ocular pathology which may affect outcome (Yorston, 2008). This was also seen in our study as most of our patients presented at a later stage with complicated cataracts.

Demographic factors such as age and sex were not significant factors in this study. However other studies have shown that increasing age was one of the risk factor for poor outcome. (Matta et al., 2019; Gogate et al.,2011). Male gender also had a higher odds of having a poor outcome in this study. Gogate et al (2011) also found better outcomes in females. Contradictory to this Matta et al (2019) found males had a better outcome.

Pre-operative ocular pathologies were present in 25.5% of eyes undergoing surgery which is higher than other studies in other developing countries (Matta et al.,2019; Yorston et al., 2002)**.** The difference could be because most of the patients in this study were of the older age group**.** In this study patients were three times likely to have a poor outcome if they had an ocular pathology such as glaucoma or old iritis. Ocular pathology has been reported to adversely affect visual outcome in several other studies (Matta et al.,2019; Sonron et al., 2015; Gogate et

al.,2011). It would be ideal to operate on eyes with no other pathology. However, cataract surgery often needs to be carried out even on eyes that have other ocular pathology and this can result in a poor outcome. Systemic comorbidities such as hypertension, diabetes mellitus and RVD were not significant risk factors to poor outcome in this study. This is because blood pressure and blood sugar levels are well controlled before the patients can undergo cataract surgery at the Eye Hospital. However other studies have showed that systemic comorbidities such as diabetes mellitus and hypertension are risk factors for poor outcome (Sonron et al.,2015: Leske et al.,2010). This could be because of pre-existing diabetic or hypertensive retinopathy which was not present in our study.

Intra operative complications were significantly higher compared to other studies (Khanna et al.,2020: Stein 2012: Franzco et al., 2010). This could be attributed to most patients presenting very late with hyper mature cataracts and weak zonules which have high intra operative complication rates according to other studies (Rutar et al., 2009; Yorston et al., 2002). Also the Eye hospital being a training institution for Ophthalmology residents the complication rates could be higher. This study helped to suggest that cases done by residents had an increased risk of poor outcomes. A study by Khaana et al (2020) LV Prasad Eye Institute (LVPEI) in Liberia showed a good best corrected visual outcome of 88% because the center has highly trained cataract surgeons. Various studies have compared cataract surgeries performed by residents and those performed by experienced surgeons, and it shows that visual outcome improves with experience of surgeon (Puri et al.,2015). Recognizing the importance of the resident surgeons learning curve is relevant in warranting patient safety and reducing poor outcome.

Intra operative complications were seen to be significantly associated with poor outcome in this study. Multivariate analysis showed that the odds of having a poor outcome were higher if intra operative complications had occurred during surgery. Other studies have also shown that intraoperative complications are a significant risk factor for poor outcome (Khanna et al.,2020: Matta et al.,2019; Lindfield et al., 2012). Yorston (2008) has suggested that in developing countries, there is a high incidence of capsular rupture and vitreous loss, due to the complicated nature of many cataract operations performed, rather than to inadequacy of training, skill, or equipment used.

Post-operative complications drastically affected the outcome of cataract surgery. Patients were twice as likely to have a poor outcome in the presence of an immediate post-operative complication. Some of the immediate complications like corneal oedema resolved with

medication but others like retained lens matter had to go back for additional surgery. Acute endophthalmitis which is a dreaded complication was found in 1 patient (0.51%). The incidence of endophthalmitis may vary according to studies. Studies from Europe give the estimated incidence as 0.14% (Franzco et al., 2010). It was also noted that patients who presented with late post-operative complications had a very poor visual outcome, because most of the post-operative inflammation has resolved by that time and any complication arising would need additional surgery such as keratoplasty for pseudophakic bullous keratopathy and vitrectomy plus secondary IOL implantation for IOL drop. Posterior capsule opacification was the most common late complication seen in our study. Posterior capsule opacification is an important cause of poor outcome following cataract surgery. This risk can be reduced with thorough cortical clean up during surgery. This was also seen in another study where 20% of pseudophakic patients required yag laser capsulotomy to improve visual outcome (Franzco et al., 2010).

A very significant limitation was that almost 37 % of patients did not return for 6 weeks' follow-up review. This is similar to follow up rates seen in other developing countries (Congdon et al.,2013; Yorston, 2008). Patients who had less intraoperative and post-operative complications were less likely to come back for follow up visits. It could be likely that there were satisfied with their visual outcome or they had difficulty accessing services and this needs to be further investigated. This could under estimate the good outcome at last follow up. Strategies to improve follow-up can include adequate pre-operative counselling, refunding transport costs, free spectacles and sending follow up reminders. Another limitation was malfunctioning of the biometry machine so biometry was not done in many patients and any standard available intraocular lens was implanted. Whilst the implantation of a standard power intraocular lens is acceptable practice in some out-reach situations, biometry and the implantation of a customized intraocular lens power would give a better visual outcome (Khanna et al.,2020).

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study revealed that majority of cataract surgeries done at University teaching Hospitals-Eye Hospital in Zambia had a good visual outcome. Factors associated with a poor visual outcome were presence of ocular pathology, intra-operative and post-operative complications (immediate and late). Monitoring visual outcomes and working on reducing intra-operative complications and post-operative complications can significantly improve the outcome of cataract surgery.

6.2 Recommendations

1. All patients should have a thorough pre-operative evaluation before surgery, to exclude other ocular pathology.
2. Patients with other ocular pathology and those suspected of having ocular pathology (in case of no fundus view) should have adequate pre-operative counselling to expect poor outcome.
3. All surgeons should monitor the outcome of the surgery in their individual patients. Monitoring visual outcome individually is guaranteed to improve the outcome of their surgery.
4. Resident surgeons should be supervised in all stages of cataract operations and continuous simulation programs to be made available for learning of cataract surgery.
5. Complications can and will occur, even in the best of hands, the operating theater must be prepared to manage surgical complications competently in terms equipment and consumables.
6. Post-operative follow-up and managing of post-operative complications should be done meticulously to reduce poor outcome.
7. All patients need to have correct biometry done and intra ocular lens should be available.
8. It should be compulsory to refract all patients at 6 weeks follow up and to be given free spectacles.

REFERENCES

Bastawrous, A; Dean, WH; Sherwin, JC, 2013, Blindness and visual impairment due to age-related cataract in sub-Saharan Africa: a systematic review of recent population-based studies. The British journal of ophthalmology.

Basti, S., Vasavada, A.R., Thomas, R, Padhmanabhan, P., 1993. Extracapsular cataract Surgical techniques. Indian Journal of Opthalmology 41,195Bowling, B., 2019, Kanski's clinical ophthalmology, A clinical approach.,9th edition. ed, Expert consult. Elsevier, Sydney, Australia.

Cook C. How to improve the outcome of cataract surgery. *Community Eye Health*. 2000;13(35):37-8. PubMed PMID: 17491958; PubMed Central PMCID: PMC1705972.

Franzco C, Omar A, Spalton J 2010 Complications of cataract surgery. Clinical and Experimental Optometry ,Optometrists Association Australia

Gogate P, Vakil V, Khandekar R, Deshpande M, Limburg H ,2011 Monitoring and modernization to improve visual outcomes of cataract surgery in a community eyecare center in western India. J Cataract Refract Surg 37: 328–334. 10.1016/j.jcrs.2010.08.034

Hussen, M.S., Gabriela's, K.L., Said, M.A., Belete, G.T., 2017. Visual outcome of cataract surgery at Gondar University Hospital Tertiary Eye Care and Training Center, North West Ethiopia. Clinical Optometry. https://doi.org/10.2147/OPTO.S122953

Isawumi, M.A., Soetan, E., Adeoye, A., Adeoti, C.O., 2009. Evaluation of Cataract Surgery Outcome in Western Nigeria. Ghana Med J 43, 169–174.

Khairallah, M., Kahloun, R., Bourne, R., Limburg, H., Flaxman, S.R., Jonas, J.B., Keeffe, J., Leasher, J., Naidoo, K., Pesudovs, K., Price, H., White, R.A., Wong, T.Y., Resnikoff, S., Taylor, H.R., 2015. Number of People Blind or Visually Impaired by Cataract Worldwide and in World Regions, 1990 to 2010. Invest. Ophthalmol. Vis. Sci. 56, 6762–6769. https://doi.org/10.1167/iovs.15-17201

Khanna RC, Rathi VM, Guizie E, Singh G, Nishant K, Sandhu S, et al. (2020) Factors associated with visual outcomes after cataract surgery: A cross-sectional or retrospective study in Liberia. PLoS ONE 15(5): e0233118. https://doi.org/10.1371/journal.pone.0233118

Leske MC, Wu S-Y, Nemesure B, Hennis A, Barbados Eye Studies Group. 2010. Causes of visual loss and their risk factors: an incidence summary from the Barbados Eye Studies. Revista Pan americana de Salud Publica 27:259–26

Lindfield R, Griffiths U, Bozzani F, Mumba M, Munsanje J 2012 A rapid assessment of avoidable blindness in Southern Zambia. PLoS One 7: e38483 10.1371/journal.pone.0038483

Lindfield, R., Vishwanath, K., Ngounou, F., Khanna, R.C., 2012. The challenges in improving outcome of cataract surgery in low and middle-income countries. Indian J Ophthalmol 60, 464–469. https://doi.org/10.4103/0301-4738.100552

Matta, S., Park, J., Palamaner Subash Shantha, G., Khanna, R. C., & Rao, G. N. (2016). Cataract Surgery Visual Outcomes and Associated Risk Factors in Secondary Level Eye Care Centers of L V Prasad Eye Institute, India. *PloS one*, *11*(1), e0144853. https://doi.org/10.1371/journal.pone.0144853

Mensah Agatha,2019, Factors affecting cataract surgical outcomes in the eastern region of Ghana, University of Ghana

Ministry of Health Zambia: University Teaching Hospitals-Eye hospital,2017 annual report.

Norregaard JC. 2007. Results from the international cataract surgery outcomes study. Acta Ophthalmological Scandinavia 85:5–32 DOI 10.1111/j.1600-0420.2007.00937.

Oderinlo O, Hassan AO, Oluyadi FO, Ogunro AO, Okonkwo ON, Ulaikere MO, et al. Refractive aim and visual outcome after phacoemulsification: A 2-year review from a Tertiary Private Eye Hospital in Sub-Saharan Africa. Nigerian journal of clinical practice. 2017;20(2):147–52. pmid:2809142

Pascolini D,Mariotti SP. 2012. Global estimates of visual impairment: 2010. British Journal of Ophthalmology 96(5):614–618 DOI 10.1136/bjophthalmol-2011-300539

Puri, S., Kiely, A. E., Wang, J., Woodfield, A. S., Ramanathan, S., & Sikder, S. (2015). Comparing resident cataract surgery outcomes under novice versus experienced attending supervision. Clinical ophthalmology (Auckland, N.Z.), *9*, 1675–1681. https://doi.org/10.2147/OPTH.S85769

Rutar T., Porco T. C., Naseri A. (2009) Risk factors for intraoperative complications in resident-performed phacoemulsification surgery. *Ophthalmology*. 2009;116(3):431–436. doi: 10.1016/j.ophtha.2008.10.028

Sonron, E., Tripathi, V., Bridgemohan, P., Sharma, S., 2015. A retrospective study on the outcomes of cataract surgery in an Eastern Regional Health Authority hospital of Trinidad and Tobago. PeerJ 3. https://doi.org/10.7717/peerj.1222

Stein, J.D., 2012. Serious Adverse Events After Cataract Surgery. Curr Opin Ophthalmol 23, 219–225. https://doi.org/10.1097/ICU.0b013e3283524068

The Royal College of Ophthalmologists. 2010. Cataract Surgery Guidelines. London: Available at https://www.rcophth.ac.uk/standards-publications-research/clinical-guidelines/

Venkatesh R, Muralikrishnan R, Balent LC, 2005. Outcomes of high volume cataract surgeries in a developing country. Br. J. Ophthalmol. 2005 Sep1;89(9):1079–83

Wang, W., Yan, W., Müller, A., He, M., 2017. A Global View on Output and Outcomes of Cataract Surgery With National Indices of Socioeconomic Development. Invest. Ophthalmol. Vis. Sci. 58, 3669–3676. https://doi.org/10.1167/iovs.17-21489

World Health Organization, Informal consultation on analysis of blindness prevention,1998, Geneva, Switzerland, The World Health Organisation ,WHO/PBL/98.68 ed

World Health Organization, Global Data on Visual Impairments,2010.2012, Geneva, Switzerland, The World Health Organization by WHO/NMH/PBD/12.01

Yorston D. 2008, Cataract Complications. Community Eye Health. International Center for Eye Health, London;21(65)

Yorston D, Gichuhi S, Wood M, Foster A (2002) Does prospective monitoring improve cataract surgery outcomes in Africa? Br J Ophthalmol 86: 543–547.

APPENDEX A:

PARTICIPANTS INFROMATION SHEET

Title of study: FACTORS ASSOCIATED WITH THE OUTCOME OF CATARACT SURGERY AT UNIVERSITY TEACHING HOSPITALS-EYE HOSPITAL IN LUSAKA, ZAMBIA

Introduction: My name is Dr Fatima Umerji, a medical doctor pursuing a Master's degree in Ophthalmology at University Teaching Hospitals, Eye hospital Lusaka Zambia. As a part of my academic qualification I am conducting a study to establish factors associated with the outcome of cataract surgery at University Teaching Hospitals, Eye hospital Lusaka Zambia.

Nature and purpose of study: You have been asked to join the research because you are undergoing a cataract surgery. This study looks at what the outcome of cataract surgery will be and also what the various factors are behind such an outcome. The purpose of this study is to find out what vision you will get after undergoing the cataract surgery. It is also intended to find out what has led to achieving that vision such as you may have other eye diseases or complications during surgery or poor post-operative care which may not give you the vision you desire.

Procedure of the study: If you agree to participate in this study, your participation will require a demographic history, a full eye examination will be done a day before the operation. On the day of operation your surgical findings will be recorded. Post-operative eye examination will be done the day after the operation. Follow up eye examination will be done and recorded at week 1- and 6-weeks post operation.

Possible risks: To the best of my knowledge no known direct risks will be posed by your participation in this study, however the risks which are present are those that are related to the cataract surgery procedure itself such as anxiety caused by the surgery and anxiety during the post-operative examinations. The patient will also experience some discomfort and mild pain after the cataract surgery procedure for a period of 1 day to 6 weeks' post-surgery. In this period patient is expected to put drops in their eye and not carry out heavy duty work.

Possible benefits: recommendation from this research will contribute in improving the outcome of the cataract surgeries we perform at our eye hospital.

Confidentiality: The identity and all information collected in the study will be confidential and only the researcher will have access to it. The study will not affect your management in any way. Your participation is voluntary and a written consent will be taken from you. If any time during the study you feel like withdrawing, then you shall be permitted without penalty and treatment will not be withheld. You are also free to skip any questions that you may not want to answer.

Financial arrangements: you will not be paid for participating in the study. The follow up visits are routine and you have to arrange for your own transport.

Any queries or clarifications can be directed to:

Dr Fatima Umerji, 0977462282, University teaching hospital, Eye hospital Lusaka Zambia. p/bag RW1X, UTH. Lusaka.

ERES CONVERGE, Plot no 1, Cnr Joseph Mwilwa Road, Rhodes Park, Lusaka, Zambia, tel: 0955155633/0955155634/0977493220. Email: eresconvergeltd@gmail.com

APPENDIX B: CONSENT FORM

TITLE OF STUDY: FACTORS ASSOCIATED WITH THE OUTCOME OF CATARACT SURGERY AT UNIVERSITY TEACHING HOSPITALS-EYE HOSPITAL IN LUSAKA, ZAMBIA

I_____ have read the above information, or it has been read to me and I understand the nature, conduct benefits and risks of the clinical study. I am aware that my personal details will be anonymously processed into the research report. I am free to skip questions I may not want to answer and I am allowed to withdraw anytime from the study without penalty. I consent voluntarily to participate in this study.

Name: _____

Signature: _____or thumb print_____

Date _____

STATEMENT BY RESEARCHER:

I have accurately read out the information sheet to the participant and to the best of my ability made sure that they have understood. I confirm that the participant was given an opportunity to ask questions about the study and all the questions have been answered correctly and to the best of my ability. I confirm that the participant has not been coerced into giving consent and that it has been given freely and voluntarily.

Name of researcher _____

Signature of researcher_____

Date_____

APPENDIX C: DATA COLLECTION SHEET

1.0 Demographic data

1.1. Date _____

1.2. PIN no. _____

1.3 Age (yrs.) _____

1.4. Sex: ____

2.0. Preoperative examination

2.1. Eye Operated: RE □LE □

2.2. Visual Acuity: Presenting _____

Pinhole/Best corrected Visual acuity ____

2.3 Intraocular power _____

2.4. Intraocular pressure _____

2.5. Pathologies possibly affecting the outcome:

None	
Corneal scar	
Pseudoexfoliation	
Old iritis	
Age related macular degeneration	
Glaucoma	
Diabetes	
Hypertension	
Others (specify)	

3.0 Surgery

3.1. Date _____

3.2. Surgeon:

Ophthalmologist □ Ophthalmology resident □

3.3. IOL-Power inserted _____

3.4. IOL-Type: AC IOL □ PC IOL

3.5. Surgical Technique:

3.5.1. Type: MSICS □ Phaco□

3.5.2. IOL: Capsular Bag □ Sulcus □ AC IOL □ No IOL □ Not indicated □

4.0 Intra-op Complications:

None		Iridodialysis	
Premature entry		Posterior capsule tear	
Button holing		Posterior capsule rupture	
Iris prolapse		Vitreous loss	
Descemets membrane detachment		Dislocation of nucleus	
Endothelial damage		Retained lens matter	
Zonular Dehiscene		Others (specify)	

5.0 Post-operative findings

Post-operative clinical findings		Day 1 post op ✖	Week 2 post op ✖	Week 6 post op ✖
Visual acuity				
BCVA				
Wound	wound opposed			
	wound leak			
	Iris prolapse			
Cornea	Clear			
	Striate keratitis			
	Epithelial defect			
	Epithelial edema			
	DM strip more than 1/3			
Anterior chamber	Normal			
	Shallow AC			
	Iritis			
	Hyphaema			
	Minimal cortex			
	Significant cortex			
	Fibrinous uveitis			
	Severe uveitis with hypopyon			
	Vitreous in AC			
Pupil/iris	Round			
	Irregular			
	Iridodialysis			
IOL position	In bag			
	In sulcus			
	Not assessable			
	Aphakic			

PC	Intact			
	Rent			
Fundus	Normal			
	Pathology (specify)			

6.0 Post-operative complications

a) Immediate post-operative (< 4 weeks)

None	
Corneal oedema	
Striate keratopathy	
Wound leak	
Shallow AC	
Hyphaema	
Iris prolapse	
Retained lens matter	
Uveitis	
Acute Endophthalmitis	
Others (specify)	

b) Late complications (> 4 weeks)

None	
Cystoid macular oedema	
Delayed onset Endophthalmitis	
Retinal detachment	
Pseudophakic bullous keratopathy	
Malpositioning of IOL	
Posterior capsule opacification	
Secondary glaucoma	
Others (specify)	

7.0 Post-operative Visual acuity at 6 weeks _____ Best corrected Visual acuity (BCVA) _____