

"OUTCOME OF CHILDHOOD CATARACT SURGERY AS SEEN AT KNH"

A dissertation submitted as part fulfillment for the degree of Master of
Medicine (Ophthalmology), University of Nairobi

By

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DECLARATION

This dissertation is my original work, and has not been presented for a degree at any other university.

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DEDICATION

This book is dedicated first to my God Who has been with me during my training at Nairobi University.

It is also dedicated to my loving and supporting wife Clairette and daughters Keren and Keziah; to my mother Josephine and all my brothers and sisters who have enabled me be what I am to day.

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LIST OF ABBREVIATIONS

IOL	Intraocular lens
KNH	Kenyatta National Hospital
LE	Left eye
LWO	Lens washout
LWO+PPC+AV	Lens washout plus primary posterior capsulotomy plus anterior vitrectomy
PCO	Posterior capsule opacification
KCMC	Kilimanjaro Christian Medical College
RE	Right eye
VA	Visual acuity
WHO	World Health Organization
CRS	Congenital rubella syndrome
CMV	Cytomegalovirus

ABSTRACT

Background: Cataract is the leading cause of blindness in children in East Africa. The outcome of surgery is poor, partly because of the inadequate correction of aphakia and also the loss to follow up in patients who have uneducated parents in most of cases.

Objectives. The aim of the study was to determine the visual outcome, the intraoperative and postoperative complications due to the childhood cataract surgery at KNH

Methodology: A retrospective study, reviewed 77 patients between 1995 and 2005, 8 patients were excluded, with a total of 121 eyes analyzed from 58 bilateral and 11 unilateral cataracts. A follow up of 6 months was done and data was analyzed using SPSS 11.5 version

Results: Preoperatively, 63.8% of patients were male, with a p value <0.001 62.3% of them were aged 1 year or less.

It was noticed 72.5% of patients who came to KNH 6 months or less after the problem was noticed with a mean of 6.4 months for congenital cataract and 35.7 months for developmental cataract. 28 eyes had primary IOL implantation, 17 eyes had secondary IOL implantation and 76 eyes remained aphakics.

Preoperatively, 71.1% of eyes were blind with 19.8% and 12.4% having nystagmus and strabismus respectively.

LWO alone and LWO+PPC+AV were the surgeries done in majority of cases (71.1%).

There was an improvement in VA at 2 months post operatively compared to the VA at presentation ($p < 0.001$). However, there was no further improvement in VA at 4 and 6 months ($p = 0.213$ and 0.238).

The main complications at 2, 4 and 6 months after surgery were PCO and updrawn pupil. PCO occurred mainly in patients who had LWO without anterior vitrectomy ($p < 0.001$, < 0.001 and 0.148 at 2, 4 and 6 months post operatively).

The percentage of children using aphakic glasses was 38.0%, 34.7% and 24.8% at 2, 4 and 6 months post operatively.

In view of the fact that many patients were lost to follow up, it was not possible to determine how many patients remained blind due to lack of aphakic glasses despite good surgery.

VA in eyes which had LWO with primary IOL implantation compared to the VA in those which had LWO without IOL implantation showed a statistically significant difference at 2 months post operation; however VA remained the same at 4 and 6 months after surgery.

Conclusion: The outcome of childhood cataract surgery at KNH is poor; despite few complications occurred during surgery. The main problem remains the late presentation to hospital and the loss of follow up.

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1.0. INTRODUCTION

1.1. Definition

Childhood cataract is defined as an opacification of the lens which occurs early in life.

Childhood cataract definition is complicated by the fact that this is not a single disease entity but it represents a group of diseases that is defined by age.

Childhood cataract can be classified according to the following criteria:

- Age of onset (congenital, infantile or juvenile).
- Morphology of the lens opacity (lamellar, sutural, nuclear, cortical etc).
- Underlying causes (genetic, congenital infection etc) ^{1, 2}.

1.2. Rationale

Previous observation and WHO survey indicated that the outcome of childhood cataract surgery in developing countries is poor despite important progress done, therefore the importance of doing a study in our setup.

Currently there is no data available on the outcome of childhood cataract surgery at KNH. This study will provide valuable information on the outcome of cataract surgery in children at KNH as well as provide baseline data with which future developments in management of childhood cataract can be compared to.

1.3. Literature Review

1.3.1. Prevalence of congenital cataract

Childhood cataract is the most common treatable cause of childhood blindness being responsible for 10-30% of all childhood blindness . The situation of blindness due to childhood cataract has improved in industrialized countries due probably to the result of better management of cataract ⁵ . In developing countries, childhood cataract surgery is very different from that of routine senile cataract. In adults, surgery may be delayed for years without affecting the visual outcome. In infants, if the cataract is not removed during the first year of life, the vision will never be fully regained after surgery ^{5, 6, 7, 8} .

One reason of the poor outcome of childhood cataract surgery is the result of difficulty in obtaining full correction of refractive errors in young children. Aphakic lenses are expensive and impractical for most families. Glasses get lost or broken and are difficult to fit on infants and young children ^{3, 9, 10} .

There are no clear guidelines in developing countries about the appropriate management of childhood cataract as it is in industrialized countries ^{11, 12, 13, 14} .

A child becomes bilaterally blind every minute, primarily within developing countries ⁹ .

In a total of 1.5 million blind children in the world, 1.3 million live in Asia and Africa, and 75% of all causes are preventables or curables ^{9, 10, 11} .

The prevalence of blindness varies according to the socio-economic development of the country and is related to the availability of primary health care and eye care services. In developing countries the rate of childhood blindness can be as high as 1.5 per 1000 population⁹. In industrialized countries, this figure is 10 times lower⁸. Studies done in Asia and Africa have shown a high prevalence of childhood blindness, respectively 1.1/1000 children in Malawi, 1.09/1000 in Bangladesh, 0.7/1000 children in Gambia⁹. In East Africa, cataract is now the leading cause of blindness in children. A study in Uganda estimated that cataract was responsible of 30% of all cases of blindness and visual impairment in children. The results of cataract surgery in Uganda were poor: 56% of children operated had a corrected vision of less than 6/60³.

Currently approximately seven million adult cataract surgeries are done annually in the world. Precise data related to the total number of pediatric cataract surgeries performed annually are not available^{9, 10, 12, 13}. Pediatric cataract blindness presents an enormous problem to the developing world in terms of human morbidity. Restoring the sight of one child blind from cataract may be equivalent to restoring the sight of 10 elderly adults⁹.

Due to the effect of childhood blindness not only on the child, but also on the whole family, the control of childhood cataract has been identified as a priority of the WHO's global initiative for the elimination of avoidable blindness by the year 2020^{10, 11}.

1.3.2. Visual acuity assessment

The outcome of visual acuity in children is a challenge¹². The visual pathway is immature at birth; its maturation being rapid in the first year of life; adult level is reached around 5 years of age. The visual acuity in a child with childhood cataract should be measured as soon as possible, this will indicate if visual acuity is developing normally^{13, 14, 15, 16}. It is not always possible to obtain a quantitative measurement of a child's visual acuity; however a qualitative assessment by an experienced observer can be useful. A qualitative assessment will show if a child is blind or not^{1, 17, 18, 19}.

Measuring visual acuity in children is a special skill requiring time, patience and understanding. Methods used should be adapted to the child's age, abilities, knowledge and experience. Preverbal children can not describe what they see; so they are tested using preferential looking techniques: e.g. Lea symbols grating. In school children; visual acuity can be measured by Cardiff test, Landolt test or Snellen E charts¹⁹.

1.3.3 Etiology of childhood cataract

Childhood cataract in most cases is idiopathic^{1, 2, 18, 20}. In industrialized countries, the underlying cause cannot be determined in approximately 50–56% of cases¹.

Approximately 20% have a positive family history of isolated cataract, with autosomal dominant disease being more important¹. The underlying cause in 30% is the result of chromosomal abnormalities, genetic diseases with lens opacities in association with

systemic abnormalities, metabolic disorders, intrauterine infections, prematurity, trauma or in association with other ocular abnormalities^{1, 16, 21}. There have been very few reports from developing countries, but a recent prospective hospital based study in a large eye unit in south India found 26% of childhood cataract was due to congenital rubella syndrome. This study showed 25% of childhood cataract to be due to genetic factors¹.

Despite unlimited resources in industrialized countries, no cause is found for the majority of childhood cataract. In developing countries there is no benefit in doing a large number of investigations; the most important element is to take a proper mother and child's history^{5, 20}.

1.3.4 Management of childhood cataract

Management of childhood cataract remains a challenge. It's characterized by increased intra-operative difficulties, increased post-operative inflammation, changing refractive state of the eye, more common post-operative complications and a tendency to develop amblyopia; all of this account for the difficulty in achieving a good visual outcome in pediatric cataract patients^{9, 21}.

Questions related to the management of childhood cataracts include the timing of surgery, the type of surgery, the surgeon doing the surgery and the place where the surgery will be done. Good visual outcome depends on doing surgery as early as possible within the period of onset of visually disabling cataract^{22, 23}.

Several articles have been published regarding adult and pediatric cataract management in the industrialized world. To the best of my knowledge, in developing countries there are no publications that provide guidelines regarding the management of pediatric cataract⁹. However, in general, methods for pediatric cataract surgery used in developing world are needling and aspiration or extracapsular cataract surgery with or without IOL implantation⁵.

Even if there is no clear guideline about childhood cataract surgery for developing countries, it is agreed that LWO with primary posterior capsulotomy and anterior vitrectomy (LWO+PPC+AV) provide the best chance of a long term clear visual axis⁹,^{18, 24}. When long term follow up is not likely and YAG laser treatment is not available, the recommended method is LWO+PPC+AV+IOL implantation for all children 8 years of age and younger. For children above 8 years old, PPC is still recommended although AV is optional^{9, 18}.

1.3.5. Complications

Cataract surgery in children carries a higher incidence of complications than in adults. Every child who does not have a posterior capsulotomy will develop posterior capsule opacification⁵. This can be treated by making an opening in the capsule with YAG laser

or a needle. Alternatively the posterior capsule and anterior vitreous can be removed with a vitrector. If the capsule is opened without removing the vitreous, the opacification may recur on the anterior hyaloid face^{1, 5, 25, 26}

Glaucoma may occur after lensectomy particularly if it is carried out in the first weeks of life. This glaucoma is very difficult to treat and frequently leads to blindness. Delaying surgery until the child is 3-4 months old makes it unlikely that the eyes will recover 6/6 vision but it reduces the risk of glaucoma^{27, 28, 29, 30, 31}

Secondary membranes may form across the pupil, particularly in microphthalmic eyes or those with associated chronic uveitis. Thin membranes may be opened with YAG laser, thick ones may require surgery^{32, 33, 34}

Proliferation of lens epithelium is universal but usually visually inconsequential since it does not involve the visual axis. It becomes encapsulated within the remnants of the anterior and posterior capsules and is referred to as Soemmerring ring^{2, 18, 35, 36, 37}

1.4. AIMS AND OBJECTIVES

1.4.1. Aims

To evaluate the outcome of the childhood cataract surgery at KNH over 10 years.

1.4.2. Objectives

To determine the visual outcome of childhood cataract surgery at KNH over 10 years.

To determine the intra and postoperative complications of childhood cataract surgery at KNH over 10 years.

2.0. METHODOLOGY

2.1. Study Setting

The study was carried out at the record unit at KNH, a national referral and teaching hospital.

2.2. Study design

This was a retrospective study from records of children who had cataract surgery at KNH over the last 10 years (1995 to 2005).

2.3. Inclusion criteria

Children aged 15 years or less, who had cataract surgery over the last 10 years at KNH.

2.4. Exclusion criteria

Traumatic cataract.

Lack of follow-up for the firsts 6 months post operation.

2.5. Procedure

This study was approved by the department of ophthalmology and the ethical committee of the KNH. Data was collected from patient's files in the records and a follow up of patients for 6 months post operation performed.

The visual acuity was taken: - for preverbal children by preferential looking test.

- for school children by Landold or Snellen chart.

- for those who could not cooperate by estimating the child ability to fixate or to follow object or light.

The visual acuity was classified considering each eye as:

. Normal VA: 6/18 or better

. Impaired VA: <6/18 to 6/60

. Severely impaired VA: <6/60 to 3/60

. Blind: <3/60 to NPL

. Undetermined VA: . Fixating

. Following light

. Not recorded

For decimal visual acuity, log MAR conversion was used.

All data obtained were put in questionnaires and analyzed using SPSS version 11.5

2.6. Ethical consideration

Files were used confidentially.

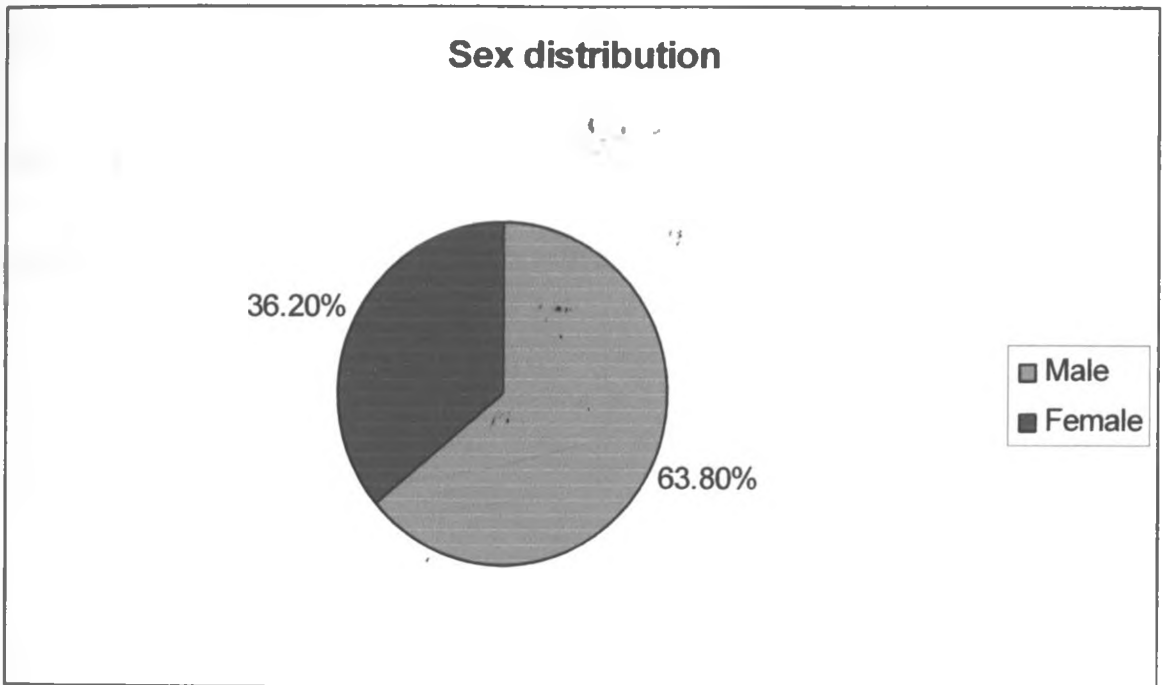
Permission from KNH was obtained for use of files and records.

3.0. RESULTS

We reviewed 77 patient's files and analyzed 69 of them; 8 files were excluded because of lack of follow up. Of the 69 patients, 58 had bilateral cataracts and 11 had unilateral cataracts, with a total of 121 eyes analyzed; because 6 patients didn't come back for surgery for the second eye.

Figure I: Sex distribution of patients

N=69



The males were more than females with a ratio of 3:2 which was statistically significant ($p < 0.001$).

Table I: Age distribution of patients

N=69

<i>Age (months)</i>	Male, n (%)	Female, n (%)	Total, n(%)
<= 12	26(37.7)	17(24.6)	43(62.3)
13 – 24	3(4.3)	1(1.4)	4(5.8)
25 – 36	5(7.2)	4(5.8)	9(13.0)
37 – 48	4(5.8)	-	4(5.8)
49 – 60	1(1.4)	-	1(1.4)
61 – 72	1(1.4)	1(1.4)	2(2.9)
> 72	4(5.8)	2(2.9)	6(8.7)
Total	44(63.8)	25(36.2)	69(100.0)

The age varied from 3months to 14 years with a median of 9 months.

Table II: Distribution of patients according to type and year of surgery N=77

Year	Patients	Lens washout without IOL	Lens washout plus IOL	Secondary IOL Implantation
1995	5	7	0	0
1996	7	10	2	0
1997	2	0	3	0
1998	6	9	2	1
1999	7	8	4	0
2000	12	20	3	9
2001	8	8	5	2
2002	10	11	4	2
2003	6	6	4	0
2004	7	10	0	2
2005	7	4	1	1
Total	77	93	28	17

8 patients did not come for follow up; they were excluded from further analysis.

Secondary IOL implantation was performed in 14 % of eyes, 62.8% of eyes remained aphakic.

Table III: Time taken between onset and presentation

N=69

<i>Time (months)</i>	<i>Number</i>	<i>Percentage</i>
<=6	50	72.5
7 – 12	3	4.3
13 – 18	-	-
19 – 24	3	4.3
25 – 30	-	-
31 – 36	7	10.1
37 – 42	-	-
>42	3	4.3
Missing	3	4.3
Total	69	100.0

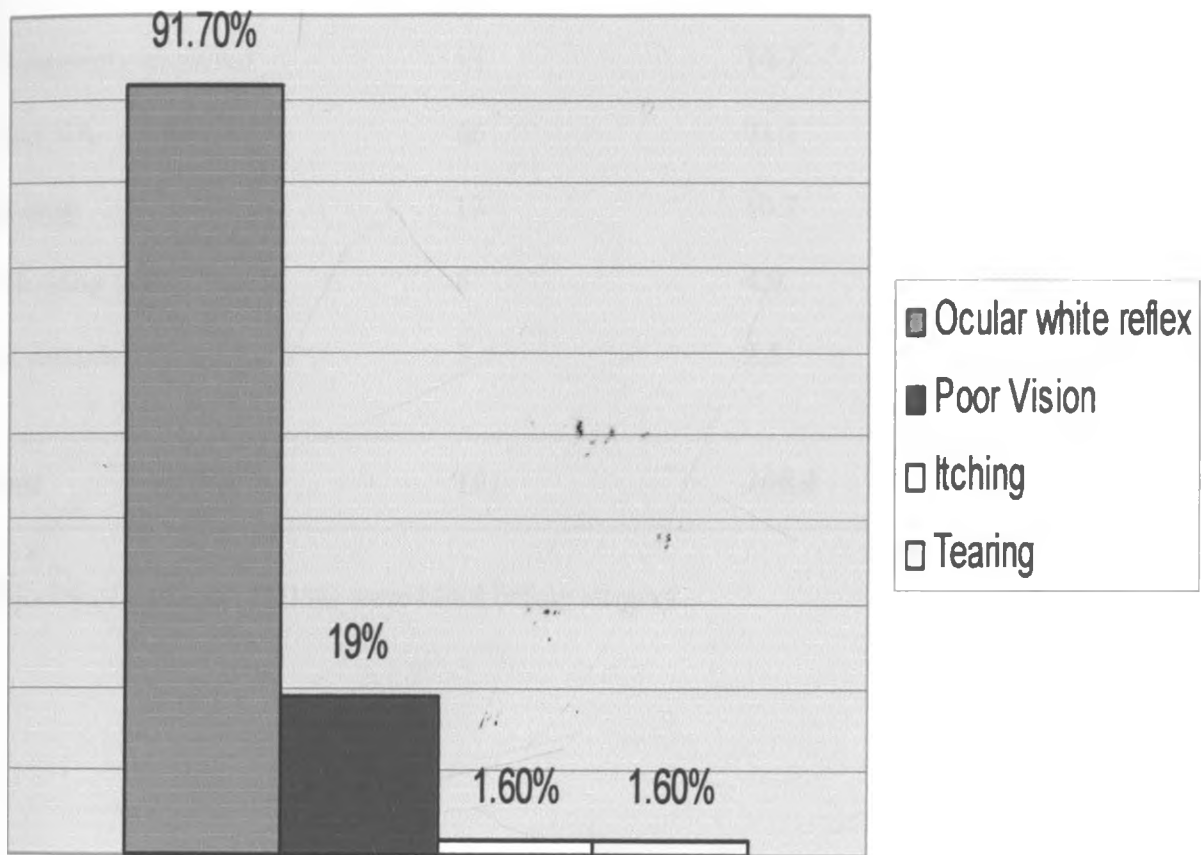
The majority of patients (72.5%) came to KNH 6 months or less after the problem was noticed (mean=6.4 months for congenital cataract and 35.7 months for developmental cataract).

Table IV: Time between presentation at clinic and surgery at KNH**N=69**

<i>Time (weeks)</i>	<i>Number</i>	<i>Percentage</i>
<1	19	27.5
1 - 2	24	34.8
3 - 4	13	18.8
5 - 6	5	7.2
7 - 8	2	2.9
9 - 10	-	-
11 - 12	1	1.4
>12	4	5.8
Missing	1	1.4
Total	69	100.0

Majority of patients (62.3%) took 1 to 2 weeks in hospital before surgery.

Presenting complaints



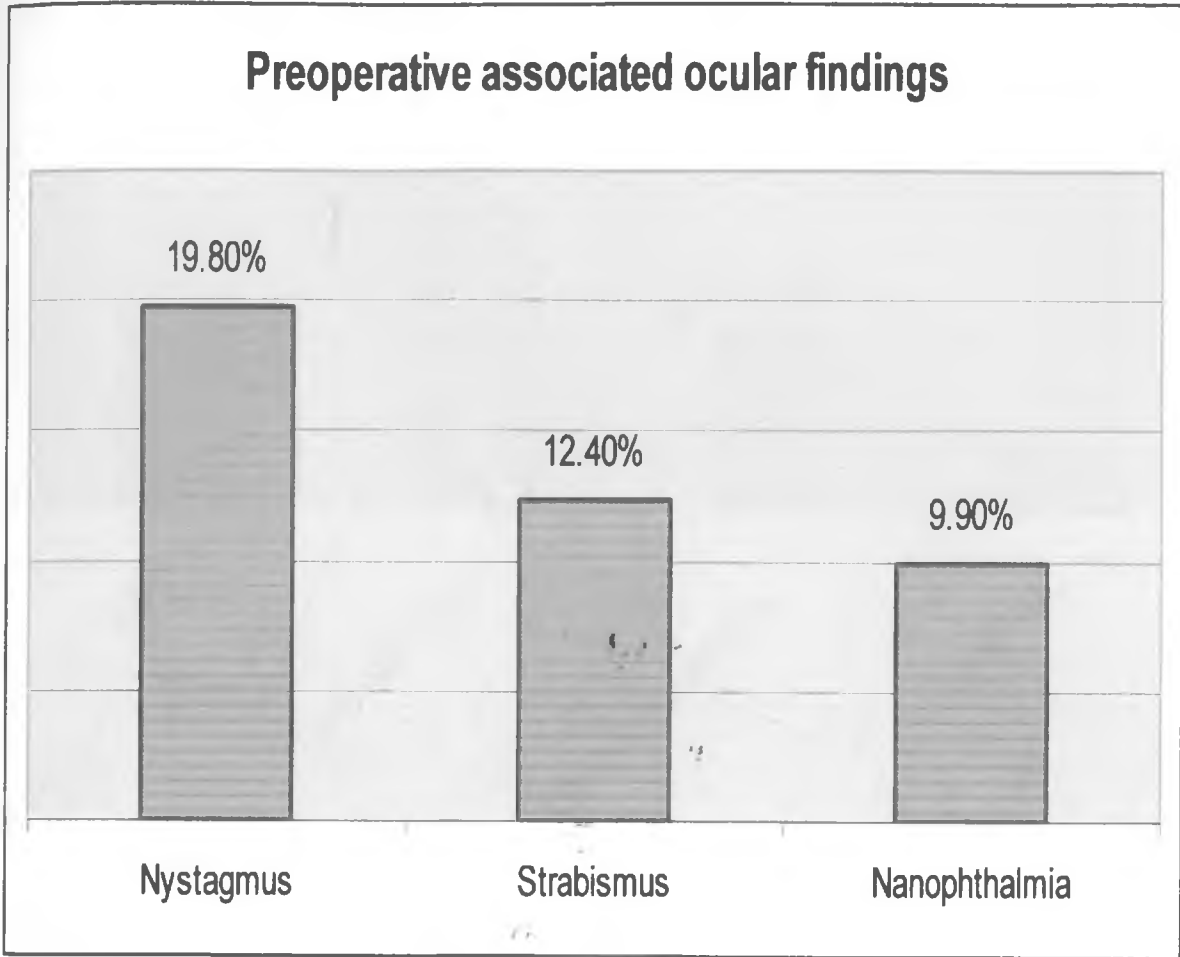
The main complaint was ocular white reflex (91.7%).

Table V: Pre-operative visual acuity

N=121

<i>Visual acuity</i>	<i>n</i>	<i>Percentage)</i>
Normal	-	-
VA impaired	-	-
VA severely impaired	13	10.7
Blind VA	86	71.1
Fixating	13	10.7
Following light	6	4.9
Not recorded	3	2.5
<i>Total</i>	<i>121</i>	<i>100.0</i>

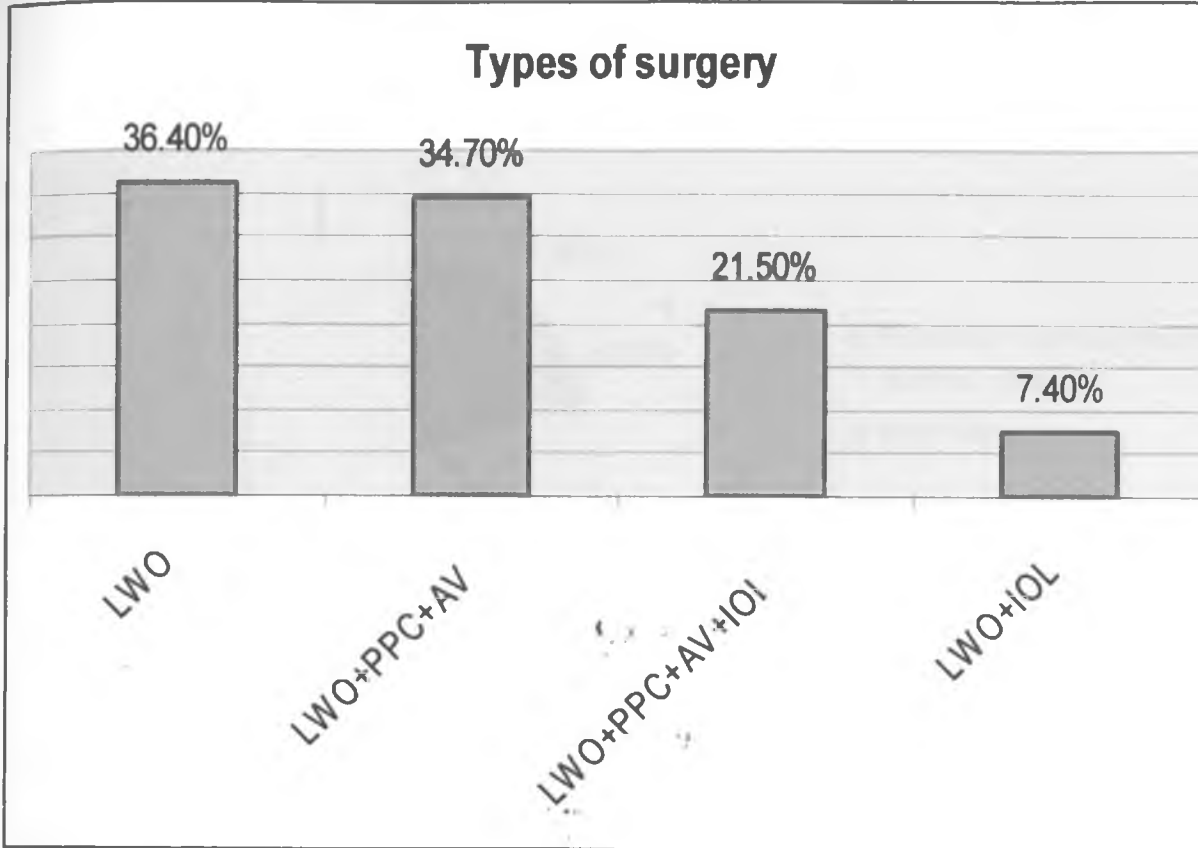
Majority of patients (71.1%) were blind before surgery.



Associated ocular findings were nystagmus, strabismus and nanophthalmia.

Figure IV: Types of surgery

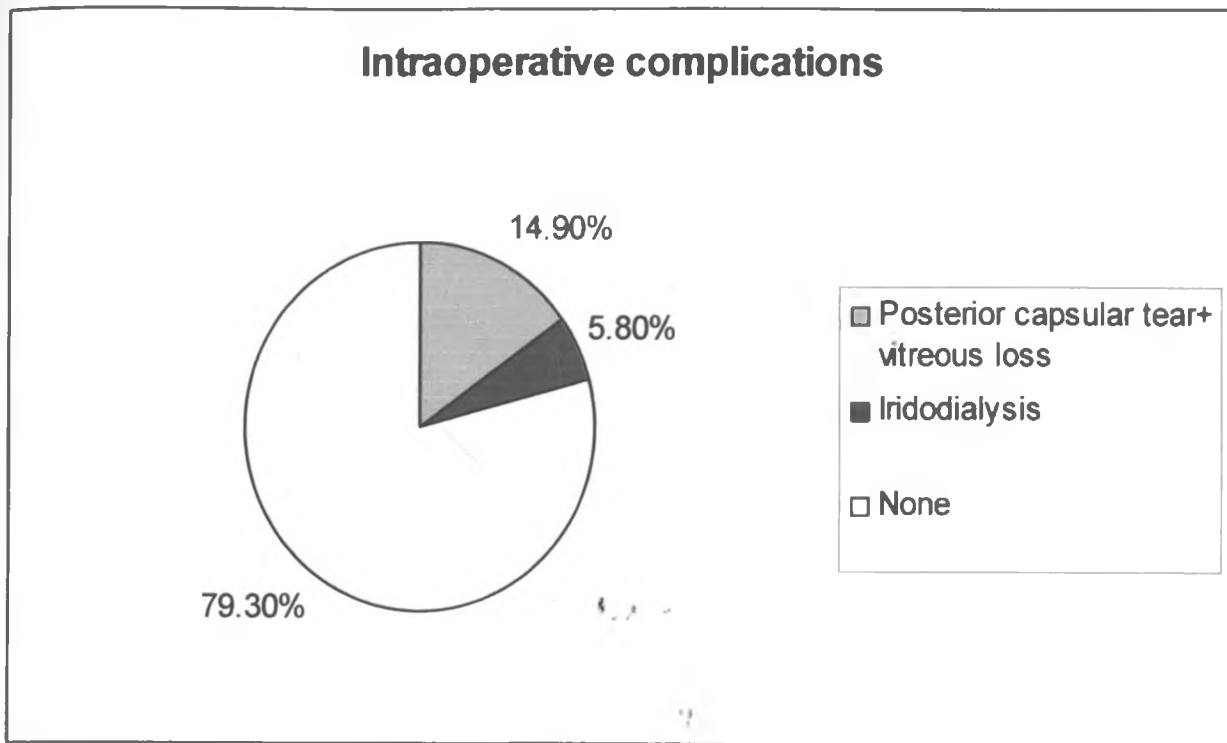
N=121



LWO and LWO+PPC+AV were the main surgeries performed in majority of cases (71.1%).

Figure V: Intraoperative complications

N=121



Few intraoperative complications occurred.

Table VI: Post-op visual acuity

N=121

<i>Visual acuity</i>	<i>2 month n (%)</i>	<i>4 month n (%)</i>	<i>6month n (%)</i>
Normal	-	8(6.6)	5(4.1)
VA impaired	52(42.9)	36(29.8)	25(20.7)
VA severely impaired	21(17.3)	16(13.2)	12(9.9)
Blind	6(4.9)	2(1.6)	4(3.3)
Fixating	8(6.6)	1(0.8)	-
Following light:	3(2.5)	-	2(1.6)
Not recorded	4(3.3)	1(0.8)	-
Missing	27(22.3)	57(47.1)	73(60.3)
Total	121(100.0)	121(100.0)	121(100.0)

There was an improvement in VA at 2 months after surgery compared to VA at presentation ($p < 0.001$). However, there was no further improvement in VA at 4 and 6 months ($p = 0.213$ and 0.238 respectively).

Table VII: Post-op complications

N=121

<i>Post-op complications</i>	<i>2 month, n (%)</i> 94	<i>4 month, n (%)</i> 64	<i>6 month, n (%)</i> 48
PCO	34(28.1)	12(9.9)	14(11.6)
Up drawn pupil	22(18.2)	17(14.0)	16(13.2)
Fibrinous uveitis	5(4.1)	-	-
Corneal decompensation	5(4.1)	3(2.5)	2(1.6)
Glaucoma	4(3.3)	-	-
Occlusio pupillae	2(1.6)	2(1.6)	1(0.8)
Phthisis	-	-	2(1.6)
None	22(18.2)	30(24.8)	13(10.7)
Total	94(77.7)	64(52.9)	48(39.7)

The main complications at 2, 4 and 6 months after surgery were up drawn pupil and PCO.

A reduction of nystagmus and strabismus was noticed after surgery (23.1%, 16.5% and 14.8% at 2, 4 and 6 months for nystagmus and 14.9%, 13.22% and 12.4% for strabismus at 2, 4 and 6 months respectively).

Table VIII: Relation between type of surgery and PCO **N=121**

<i>Type of surgery</i>	<i>PCO 2 month, n (%)</i>	<i>PCO 4 month, n (%)</i>	<i>PCO 6 month, n (%)</i>
LWO only	24(19.8)	10(8.3)	8(6.6)
LWO+PPC+AV	10(8.3)	2(1.6)	6(4.9)
None	60(49.6)	52(42.9)	34(28.1)
Total	94(77.7)	64(52.9)	48(39.7)

PCO occurred more in patients who had LWO only, compare to those who had LWO+PPC+AV (linear capsulotomy was the main capsulotomy done).

$p < 0.001$, < 0.001 and 0.148 at 2, 4 and 6 months after surgery respectively.

Table IX: Treatment given **N=121**

<i>Treatment</i>	<i>2 month, n (%)</i>	<i>4 month, n (%)</i>	<i>6 month, n (%)</i>
	94	64	48
Aphakic spectacles	46(38.0)	42(34.7)	30(24.8)
Capsulotomy	5(4.1)	5(4.1)	11(9.1)
Amblyotherapy	6(4.9)	2(1.6)	-
Peripheral iridectomy	1(0.8)	-	-
EUA	5(4.1)	-	5(4.1)
None	31(25.6)	15(12.4)	2(1.6)
Total	94(77.7)	64(52.9)	48(39.7)

Aphakic glasses were used in 38%, 34.7% and 24.8% of eyes at 2, 4 and 6 months respectively. For a total of 34 PCO at 2 months after surgery, only 5 secondary capsulotomies were done. However, more secondary capsulotomies were done at 4 and 6 months post operatively (5 and 11 capsulotomies for a total of 12 and 14 PCO).

Table X: Relationship between type of surgery and visual acuity of patient's eyes on follow up
N=121

<i>Visual acuity</i>	<i>Type of Surgery done</i>		
	LWO+IOL, n (%)	LWO with + aphakic glasses	
<u>At Month 2</u>			
Normal	-	-	
VA impaired	23(19.0)	29(23.9)	p=0.034
VA severely impaired	3(2.5)	18(14.9)	
Blind	2(1.7)	4(3.3)	
Fixating	-	8(6.6)	
Following light	-	3(2.4)	
Not recorded	-	4(3.3)	
Lost of follow up	11(9.1)	16(13.2)	
Total	28(23.1)	66(54.5)	
<u>At Month 4</u>			
Normal	2(1.7)	6(4.9)	p=0.484
VA impaired	13(10.7)	23(19.0)	
VA severely impaired	2(1.7)	14(11.6)	
Blind	-	2(1.7)	
Fixating	1(0.8)	-	
Following light	-	-	
Not recorded	1(0.8)	-	
Lost of follow up	19(15.7)	38(31.4)	
Total	19(15.7)	48(39.7)	
<u>At Month 6</u>			
Normal	-	5(4.1)	p=0.102
VA impaired	9(7.4)	16(13.2)	
VA severely impaired	2(1.7)	10(8.2)	
Blind	-	4(3.3)	
Fixating	-	-	
Following light	-	2(1.7)	
Not recorded	-	-	
Lost of follow up	20(16.5)	53(43.8)	
Total	11(9.1)	37(30.6)	

We compared the VA between eyes with LWO±PPC±AV+IOL and eyes without primary IOL implantation at 2, 4 and 6 months after surgery, we observed an improvement in visual outcome at 2 months, but we did not see any improvement at 4 and 6 months for both types of surgery(**p=0.034**, 0.484 and 0.102 respectively).

4.0. DISCUSSION

Childhood cataract remains the most common treatable cause of blindness. This situation has improved in the industrialized world; but remains bad in the developing countries ³.

4.1. Demographic characteristics

From the results, they were more males (63.8%) than females (36.2%) in the ratio of 3:2 and this was statistically significant. ($p < 0.001$) Figure I

The majority of study subjects were aged 1 year or less. Table I

A similar study performed at Kikuyu eye unit in 2003 showed a similar sex distribution with 69% of patients being males ³. Although the reason behind this was unclear, it was concluded that this could have been due to the greater value accorded to male children in the African tradition ³.

The mean time for presentation to the hospital was 6.4 months for congenital cataract and 35.7 months for developmental cataract. Table III

This delay in presentation of patients to hospital was enough to cause nystagmus in young children especially for those with total cataracts. This occurs at 3 months of age for total bilateral cataract and much earlier for unilateral cataract ⁸. The study performed at KCMC in Tanzania found a similar delay in presentation, with a mean delay of 9 months for congenital cataract and 34 months for developmental cataract ⁸.

It was noticed that 62.3% of patients took 2 weeks between the first consultation at our clinic and the surgery. Table IV

This delay was mainly due to the pre-anesthetic review in the pediatric clinic, before surgery.

The main presenting complaint was white reflex (91.7%), while 28.9% complained of poor vision. Figure II

No parent complained of nystagmus or strabismus in the children, however these 2 signs were found during ocular examination in 19.8% and 12.4% of cases respectively. Figure III

There was a reduction of nystagmus after surgery with 23.1%, 16.5% and 14.8% at 2, 4 and 6 months respectively. This reduction of nystagmus after surgery was also found at Kikuyu eye unit, with 42.3% of nystagmus before surgery and 10.2% 6 months after surgery³. This was an unexpected finding and suggested that, in some children, the developing nervous system retained sufficient plasticity to overcome nystagmus and develop steady fixation if vision was restored³.

4.2. Visual acuity

It was difficult to obtain accurate measurement of the visual acuity in this group of patients. This was expected because the methods used in visual acuity assessment in children are different from those of an adult patient. Majority of eyes (71.1%) were blind

before surgery, 10.7% had severely impaired visual acuity and 18.2% had undetermined visual acuity. Table V

The same observation was found in the Kikuyu study where 75.4% of eyes were blind before surgery³.

On preoperative assessment, we found 9.1% nanophthalmic eyes. The visual acuity of nanophthalmic eyes compared to that of normal eyes before surgery and at 2, 4 and 6 months after surgery did not show any statistically significant difference. (p was 0.788, 0.847, 0.853 and 0.880 respectively). Figure III

Most of patients (62.3%) had surgery before 1 year of age. Table I

Primary IOL implantation was performed in 28 eyes (23.1%) while secondary IOL implantation was performed in 17 eyes (14.1%). However, 62.8% of eyes remained aphakic. Table II

The low rate of primary IOL implantation may be due to the fact that majority of our patients (62.3%) were less than 1 year of age. Secondary IOL implantation was required in 44 eyes, but these patients were lost to follow up. Table II

Two months after surgery, 77.7% of the eyes were reviewed. The visual acuity was found to be impaired in 42.9% of eyes, severely impaired in 17.3% and blind in 4.9%. Table VI

This poor outcome, 2 months after the surgery may be explained by many factors. 34 eyes presented with PCO as only 5 eyes had PPC. Of the 76 aphakic eyes, only 46 eyes had aphakic spectacle correction.

Amblyotherapy was done in 6 and 2 cases out of 82 and 54 cases respectively at 2 and 4 months after surgery. This was a low percentage compared to other studies done ³. Table IX

This may be due to the fact that many patients lost follow up, also many children were not using aphakic spectacles as prescribed.

There was an improvement in VA at 2 months post operatively compared to VA at presentation ($p < 0.001$), however there was no further improvement in VA at 4 and 6 months after surgery. Table VI

The visual outcome was poor compared to the study done in Kikuyu eye unit where 44% of eyes had normal VA and 91.2% had impaired VA ³. A similar study performed in California found an even better outcome with 73% of eyes having normal visual acuity. ¹⁷

It is important to mention that many studies showed that LWO±PPC±AV compare to LWO±PPC±AV±IOL are equally effective in term of visual outcome, but secondary procedures are more required in eyes which had primary IOL implantation ⁷.

About half of the operated eyes (52.9%) were reviewed post operatively at 4 months compared to 77.7% of eyes reviewed at 2 months. The visual acuity was normal in 6.6%, impaired in 29.8%, severely impaired in 13.2% and blind in 1.6% of eyes. Table VI

The visual acuity compared to that found at 2 month post operatively remained the same ($p=0.37$). This may be due to the fact that PPC was not done in a large number of eyes, which eventually developed PCO (34 eyes); and also a large number of aphakic eyes which were not corrected by aphakic glasses.

The drop out rate for follow up was high with only 39.7% of eyes being reviewed 6 months post operatively. The VA was noted to be normal in 4.1%; impaired in 20.7%; severely impaired in 9.9% and blind in 3.3% of eyes. Table VI

This high percentage of impaired visual acuity may be due to the lack of primary capsulotomy and aphakic correction as mentioned earlier. Table IX

This outcome of VA gives the same result as the study done in Madurai/ India where on the last follow up, VA was 6/24 or better in 15% of the eyes and less than 3/60 in 55% of the eyes⁶.

The visual acuity at 4 and 6 months post operatively did not show any improvement ($p=0.59$). Table VI

Of the eyes that were reviewed post operatively at 2, 4 and 6 months, the use of aphakic glasses was noted in 38%, 34.7% and 24.8% respectively. In view of the fact that many patients were lost to follow up, it was not possible to determine how many patients remained blind due to lack of aphakic glasses or amblyotherapy, despite good surgery.

The visual acuity was compared between eyes with LWO±PPC±AV+IOL and eyes without primary IOL implantation at 2, 4 and 6 months post operatively, we observed an improvement in visual outcome at 2 months post operation, but we didn't see any improvement at 4 and 6 months for both types of surgery.

This was different from the study done in Kikuyu eye unit in 2003 where visual acuity improved up to 6 month after surgery³.

4.3. Surgical complications

The main post operative complications were PCO and updrawn pupil. Table VII

We assessed post operatively the occurrence of PCO in eyes which had LWO only and those which had LWO+PPC+AV at 2, 4 and 6 months and observed a decrease in the number of PCO in eyes which had LWO+PPC+AV. ($p < 0.001$, < 0.001 and 0.466 respectively). Table VIII

However, in this study, we had an important percentage of patients who were aged more than 3 years and therefore may not have benefited from PPC.

PCO appeared to be almost an universal complication in children. In a study conducted in India showed that PCO developed frequently following lens aspiration in children, therefore it was suggested that capsulotomy be performed primarily during childhood cataract surgery⁵. Many studies performed across the world showed that PPC reduced markedly the occurrence of PCO⁹.

Review of literature has shown that amblyopia is the leading cause of poor visual outcome in childhood cataract^{1, 3, 9}. In our setup, it is the same picture found, with 72.5% of reviewed patients who came to KNH 6 months or less after the disease was noticed; with a mean time of 6.4 months for congenital and 35.6 months for developmental cataract⁸. This is a long period, enough for a patient to develop amblyopia. Table III

A large percentage of patients did not come for follow up, therefore did not get amblyotherapy. Delay in presentation and loss of follow up in this category of patients remained a big problem in term of restoration of visual acuity, even if a good surgery was done.

5.0. CONCLUSION

The outcome of childhood cataract surgery at KNH is poor. The visual acuity improved after surgery (at 2 months post operation); but remained the same 4 and 6 months after the surgery, for both types of surgery (LWO±PPC±AV and LWO±PPC±AV+IOL).

Majority of patients were male and were aged 1 year or less.

Most patients presented late to KNH, with a long stay in the hospital when waiting for surgery and many of them did not come for follow up.

It has been observed good type of surgery, with few intraoperative complications; however the delay in presentation at KNH and the loss of follow up may explain this poor outcome of surgery.

PCO and up drawn pupil were the main complications that occurred after surgery and they also played a role in the poor visual outcome in eyes which did not get secondary capsulotomy.

6.0. RECOMMENDATIONS

The education of our population about this condition will help in an early presentation to the hospital and a good follow up.

There is a need of to think about the primary IOL implantation, many patients being aphakics because of the loss to follow up.

The need of a proper visual acuity assessment in the children clinic, because a category of patients had visual acuity not determined.

A retrospective study has his limitations because of the loss to follow up or lack of data; so the necessity of a prospective study.

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9.0. APPENDIX

The questionnaire

The outcome of childhood cataract surgery as seen at KNH

1. IP.No:

2. Admission date:

3. Discharge date:

4. Name:

5. Age:

6. Sex: 1. Male

2. Female

7. Complaint of the patient

1. White reflex

2. Poor vision

3. Painful eye

4. Tearing

5. Redness

6. Other (specify) :

8. Affected eye

1. Right eye

2. Left eye

3. Both eyes

9. a. Person who noticed first the problem

1. Parent

2. Medical personnel

3. Other (specify)

b. At what age was it noticed:

c. Time between the onset and the presentation at KNH (month):

d. Time taken between eye clinic and surgery (weeks):

10. Eye history:

1. Yes (specify):

2. No

11. Family history:

a. Childhood cataract noticed by:

1. Mother

2. Father

3. Other (specify):

b. Pregnancy: Infection, at what trimester:

1. First

2. Second

3. Third

12. Physical examination:

A. Pre-operative period:

Visual acuity:

RE

LE

1. Normal VA:.....

2. Impaired VA:.....

3. Severely impaired VA:.....

4. Blind:.....

5. Following light.....

Fixating.....

Not recorded.....

.Ocular examination:	RE	LE
.IOP:.....	.....	.....
lid:.....	.....	.....
Conjunctiva :.....	.....	.....
Cornea : .....	.....	.....
A/C : .....	.....	.....
Iris ; .....	.....	.....
Lens :.....	.....	.....
	1. Cataractous	1. Cataractous
	2. Other (specify)	2. Other (specify):
Vitreous:		
1.Normal :		
2.Other(specify) :		
Fundus :		
1.Normal :		
2.Other(specify) :		

B. Intraoperative period:

.Operated eye:

	RE	LE
.IOP:.....	.....	.....
.Surgery done:.....	.....	.....
.Complication (specify):.....	.....	.....

C. Post-operative period:

1. First PO day:

Visual acuity:	RE	LE
1. Normal VA:.....
2. Impaired VA:.....
3. Severely impaired VA:.....
4. Blind:.....
5. Following light.....
Fixating.....
Not recorded.....

Ocular examination :	RE	LE
IOP:.....	.....	.....
lid:.....	.....	.....
Conjunctiva :.....	.....	.....
Cornea : .....	.....	.....
A/C : .....	.....	.....
Iris ; .....	.....	.....
Lens :.....	.....	.....
1. Cataractous , ,	1. Cataractous	1. Cataractous
2. Other(specify)	2. Other(specify):	2. Other(specify):

Vitreous:

- 1. Normal :
- 2. Other(specify) :

Fundus :

- 1. Normal :
- 2. Other(specify) :

2. Second PO day:

Visual acuity:	RE	LE
1. Normal VA:.....
2. Impaired VA:.....
3. Severely impaired VA:.....
4. Blind:.....
5. Following light.....
Fixating.....
Not recorded.....

Ocular examination :	RE	LE
IOP:.....	.....	.....
lid:.....	.....	.....
Conjunctiva :.....	.....	.....
Cornea : .....	.....	.....
A/C : .....	.....	.....
Iris ; .....	.....	.....
Lens :.....	.....	.....
1. Cataractous	1. Cataractous	
2. Other(specify)	2. Other(specify):	

Vitreous:
 1.Normal :
 2.Other(specify) :

Fundus :
 1.Normal :
 2.Other(specify) :

4. Second month PO

.Visual acuity:	RE	LE
1. Normal VA:.....	.....	.....
2. Impaired VA:.....	.....	.....
3. Severely impaired VA:.....	.....	.....
4. Blind:.....	.....	.....
5. Following light.....	.....	.....
Fixating.....	.....	.....
Not recorded.....	.....	.....

.Ocular examination :	RE	LE
.IOP:.....	.....	.....
lid:.....	.....	.....
Conjunctiva :.....	.....	.....
Cornea : .....	.....	.....
A/C : .....	.....	.....
Iris ; .....	.....	.....
Lens :.....	.....	.....
1. Cataractous	1. Cataractous	
2. Other(specify)	2. Other(specify):	

Vitreous:

 1.Normal :

 2.Other(specify):

Fundus :

 1.Normal :

 2.Other(specify) :

5. Fourth month PO

.Visual acuity:	RE	LE
1. Normal VA:.....
2. Impaired VA:.....
3. Severely impaired VA:.....
4. Blind:.....
5. Following light.....
Fixating.....
Not recorded.....

.Ocular examination :	RE	LE
.IOP:.....

lid:.....
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Conjunctiva :.....
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Cornea :
----------------	-------	-------

A/C :
-------------	-------	-------

Iris ;
--------------	-------	-------

Lens :.....
-------------	-------	-------

1. Cataractous ,	1. Cataractous
2. Other(specify)	2. Other(specify):

Vitreous:

1.Normal :	
2.Other(specify) :	

Fundus :

1.Normal :	
2.Other(specify) :	

6. Six month PO

Visual acuity:	RE	LE
1. Normal VA:.....	.....	.....
2. Impaired VA:.....	.....	.....
3. Severely impaired VA:.....	.....	.....
4. Blind:.....	.....	.....
5. Following light.....	.....	.....
Fixating.....	.....	.....
Not recorded.....	.....	.....

Ocular examination :	RE	LE
IOP:.....	.....	.....
lid:.....	.....	.....
Conjunctiva :.....	.....	.....
Cornea : .....	.....	.....
A/C : .....	.....	.....
Iris ; .....	.....	.....
Lens :.....	.....	.....
1. Cataractous	1. Cataractous	
2. Other (specify)	2. Other (specify):	

Vitreous:

1. Normal :
2. Other(specify) :

Fundus :

1. Normal :
2. Other(specify) :

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