

DISSERTATION

**A REVIEW OF INDICATIONS FOR REMOVAL OF THE EYE AT
KENYATTA NATIONAL HOSPITAL**

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DECLARATION

I declare that this research dissertation is my original work and has never been published or presented for a degree in any other University

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DEDICATION

To my wife for her love and undying support when I was away from home.

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DEFINITION OF TERMS

Evisceration	Removal of the intraocular contents of the globe while leaving the sclera,extra-ocular muscles and optic nerve intact
Enucleation	Removal of entire globe from the orbit while preserving all other orbital structures
Exenteration	Removal of some or all of the orbital tissues, including the globe

LIST OF ABBREVIATIONS

AAO	American Academy of Ophthalmology
BCC	Basal Cell Carcinoma
BE	Both Eyes
ICU	Intensive Care Unit
KNH	Kenyatta National Hospital
LE	Left Eye
MRN	Medical Record Number
RE	Right Eye
SCC	Squamous Cell Carcinoma
UNICEF	United Nations Children's Fund
UON	University of Nairobi

ABSTRACT

Background: Life threatening conditions such as ocular malignancies are main reasons for removal of the eyes, other reasons include: ocular trauma and endophthalmitis. This removal of the eyes can have significant impact on a person's body image and his or her role in the society. The devastating effect of removal may result in monocular and/or binocular blindness. There is no current data in Kenyatta National Hospital since the last study was done two and a half decades ago (1986) and a lot has changed since then in terms of better diagnostic services and management.

Objective: To determine the indications for removal of the eye at Kenyatta National Hospital.

Methodology: The study was a retrospective case series carried out at Kenyatta National Hospital to identify patients who underwent eye removal procedures between September 2002 and September 2012. Basic demographic data, diagnosis, the eye affected, visual acuity at diagnosis and eye removal procedure performed were extracted from the patient's file and recorded in questionnaires. Descriptive analysis was used to assess indicators for eye removal while the agreement between diagnostics was compared using kappa statistics. All the analyses were done using STATA version 11.

Results: A total of 261 patients' files were reviewed during the study period and 281 eyes were analyzed. The majority (129) were under 10 years of age (49.42%) with a male to female ratio of 1.5:1. The most common type of surgery done was enucleation in 141 (50.18%), followed by exenteration in 89 (31.67%) and evisceration in 52 (18.51%). The most common indication for eye removal was retinoblastoma (42.35%), followed by squamous cell carcinoma (25.27%) and the least was phthisis bulbi (0.38%). The agreement between clinical and histopathological diagnosis was high at 93.10% (95%CI: 87.52-94.64; kappa value=0.83, P<0.001).

Conclusion: Tumors were still the commonest indications of eye removal at Kenyatta National while painful blind eye and phthisis bulbi are now rarely considered for removal of eyes. All specimens should be taken for histology irrespective of what the clinical diagnosis was.

CHAPTER ONE

INTRODUCTION AND LITERATURE REVIEW

1.1 Introduction

Removal of an eye causes a significant impact on a person's body image and role in society. This is also termed as destructive eye surgery. The decision to undertake destructive surgery is made by the ophthalmologist. Destructive ocular procedures are usually an ophthalmologist's biggest nightmare and are only recommended as a last resort.¹

There are a number of reasons taken to do this procedure. The reasons include: saving fellow eye like in sympathetic ophthalmia; to save life in the case of malignancies; to treat painful blind eye; and for cosmetic reasons. Removal of eye procedures include; enucleation, evisceration and exenteration.²

Enucleation is the surgical removal of the entire eye.³ Evisceration on the other hand is the complete evacuation of the intraocular contents through an opening in the sclera or through a keratectomy, preserving the sclera shell and extra ocular appendages.

Exenteration is a radical procedure that involves the removal of the eye, adnexa, and part of the bony orbits.⁴ Ocular exenteration is the oldest ocular procedure that was first described and performed by George Bartisch in 1583.⁵

The current enucleation technique in use was described by Farrell and Bonnet in 1885.⁶ In the same year, Mules reported the first use of the orbital implant.⁷ The choice among evisceration, enucleation and exenteration depends on the number of factors. This consist of: diagnosis, ophthalmologist's clinical judgment and patient's decision.⁸

Many cultures in the world do not advocate for the removal and therefore resist any attempts of removal despite the complications that may result due to the underlying pathology. With proper counseling, patients do accept the surgery but are more worried about their cosmetic post-

surgery. Tolley and Henninger found cosmesis to be the major stressor following eye removal surgery. Reason being that patients are not always emotionally prepared to handle the cosmetic changes that follow loss of an eye.⁹

1.2 Literature Review

1.2.1 Overview of Destructive Eye Surgery

Ophthalmology is a profession that calls for preservation of vision and improvement of eye health. Despite this, there are instances where destructive eye surgery is the only solution to intractable eye conditions not amenable to surgical or medical treatment.

Tahri et al found that there is a significant decline in destructive ocular procedures due to improved diagnosis and development of sophisticated treatment modalities like radiotherapy, laser therapy, cryotherapy and chemotherapy.^{10, 11}

In spite of the observed downward trend in the rate of destructive eye surgery in KNH, the incidence of such procedures could be reduced further by timely intervention with modern techniques such as the use of intraocular antibiotics, microsurgical, laser, cryotherapy chemotherapy and radiotherapy.¹²

1.2.1.1 Enucleation

Initially, enucleation was the only indication for the management for the painful blind eye performed as a rapid mutilating surgery in the absence of anesthesia. However, new methods of management of painful blind eyes have been developed such as retro bulbar alcohol injection and cyclophotocoagulation. Other common indications include: severely damaged eye as a result of trauma, intraocular tumors such as retinoblastoma or malignant melanoma of choroid.¹³ The volume lost is replaced by an implant either inert or biointergrated and a naturally looking prosthesis that moves symmetrically with the fellow eye.¹⁴

A study done in Uganda by Davanger et al, trauma (50.7%) was the leading indication of enucleation followed by corneal disease (18.4), painful blind eye (9.2), malignant tumor (6.7%) and least was phthisis bulbi (2.9%).²⁰

1.2.1.2 Evisceration

The indications of evisceration include endophthalmitis, panophthalmitis, ruptured globe, anterior staphyloma, painful eye, phthisis bulbi and cosmesis.¹⁵

A study done in Nigeria by Chinda et al, found that the majority of cases had an evisceration (54.7%) followed by enucleation (24.1%) and least was exenteration (21.2%).³⁰ The most common indication for removal of eyes was ocular tumors (31%) followed by endophthalmitis (30%).³⁰

1.2.1.3 Exenteration

Exenteration is a destructive procedure performed in an attempt to save life. Most exenterations are undertaken to treat malignant disease.¹⁶ Indications for orbital exenteration are as result of malignancies. These may include: squamous cell carcinoma, basal cell carcinoma, malignant melanomas. Studies from Western countries have reported a higher prevalence of basal cell carcinomas in their series and it is the commonest indication for exenteration compared to our setting where there are more cases of squamous cell carcinoma.²⁴ Basal cell carcinoma is however a rare finding.^{17, 18}

1.2.3 Considerations for eye removal surgery

Ophthalmologist recommending removal of eye should had a detailed discussion with the patient, parents or guardians and explain the benefits and complications that may result and other alternatives to the procedure before securing a consent.¹⁹

1.2.4 Post-Operative Care

After eye surgery, follow-up is important as the tissues in the socket may atrophy with time which may lead to eyelid laxity or socket changes that may affect fitting of the prosthesis.²⁰

The common causes of postoperative pain include; retro bulbar hematoma, conjunctival cyst formation, residual silicone band, and artificial eye related challenges.²¹ Other associated

complications include; blepharoptosis, entropion, ectropion, conjunctival and tenon's capsule deficiency tear insufficiency or conjunctival scarring.²²

In some instances, patients may develop complications in which various approaches can be used to manage them depending on the type of complication. Common complications include: infection, implant exposure, and stock eye syndrome.²³

Eballe oyobwa, et al showed that not all eyes should be removed. Reduction of eye removal can be achieved if technology and training of eye care workers on cyclodestructive procedures is achieved through such methods as cyclophotocoagulation. Retrobulbar alcohol or chlorpromazine injections can also be performed especially on patients with glaucoma who complain of painful blind eyes.²⁴

1.2.5 Complications

There are a number of complications that can occur as a result of these destructive procedures: ocular pain due to retro bulbar hemorrhage, conjunctival cysts, and wound dehiscence; infection and implant extrusion causing giant papillary conjunctivitis. The implanted materials can be a cause of infection. Giant papillary conjunctivitis is secondary to immunological reaction to the plastic of the prosthesis.

CHAPTER TWO

STATEMENT OF THE RESEARCH PROBLEM AND JUSTIFICATION

2.1 Statement of the Research Problem

The reasons for the removal of the eye vary from patient to patient and the justification of this removal is one that lies with the Ophthalmologist. Various diseases leave the eye in conditions so inconvenient or repulsive in external appearance that their aid must be sought, either to relieve the pain or for cosmetic purposes.

A study done in Kenyatta National Hospital by Marina Gondi showed that orbital tumors were the most prevalent indications for eye removal forming (57.3%) followed by painful blind eye (14.7%), trauma (10.2%) and endophthalmitis (7.3%). Other indication included anterior staphyloma (7.3%) and phthisis bulbi (2.9%). In a total of 68 patients, 21 of them had retinoblastoma (31.3%). The study also showed that patients received other treatment preoperatively and post operatively. Where 20 out of the 21 studied, received radiotherapy and chemotherapy and 12 of the patients received both radiotherapy and chemotherapy simultaneously.

Rahman et-al study in Manchester found out that the prevalence of exenteration was high and majority of cases were due to basal cell carcinoma followed by malignant melanoma, sebaceous cell carcinoma was the last,²⁷ but in our set up we see more squamous cell carcinoma than basal cell carcinoma and therefore most of our exenterations are done for squamous cell carcinoma.²⁴

Dawodu OA et-al study in the Gambia found out that infections were the top most indication for eye removal surgery, other indications were; staphyloma, trauma and tumors which were quite remarkable²⁸ in retrospect in developed countries; tumors and painful blind eyes were the common indications.²⁹

SD Shah –Desai study on effectiveness of enucleation or evisceration in relieving pain from painful blind eye found out that both procedures were effective in relieving pain. However, complications of surgery and orbital implants were more responsible for the recurrent pain that patient's experienced.¹⁷

Gyasi et-al study in Ghana on causes and incidence of destructive eye procedures found out that a total of 337 eyes studied underwent eye removal surgery, and male were more prone to eye removal surgery 217(64.6%) compared to females 119(35.4%).²⁹

They also found out that the most common indication of eye removal procedure was endophthalmitis /panophthalmitis (47.9%), ocular injuries (23.2%), degenerative lesions (8.9%) and tumors (5.1%), where females and patients who sustained injuries secondary to trauma were more likely to be enucleated.²⁹

2.2 Study Justification

The last study undertaken on the removal of the eye in Kenyatta National Hospital was done two and a half decades ago (1986). Meanwhile a lot has changed since then in terms of better diagnostic services. There are more advanced treatment options and availability of specialists like oculoplastic and vitreoretinal surgeons.

There is therefore need for current data and to review whether the indications for eye removal in Kenyatta national hospital have changed over time.

2.3 Main Objective.

- To determine the indications of removal of the eye at KNH.

2.4 Specific objective:

- To determine prior intervention before removal of the eye.
- To observe the trends in eye removal over a 10 year period (pattern and indications)
- To determine the correlation between clinical impression and histopathological diagnosis.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted at the Kenyatta National Hospital which is the largest referral facility in East and Central Africa. It is also a teaching hospital for the University of Nairobi, school of medicine, department of ophthalmology. The department offers trainings for both diploma and postgraduate program in ophthalmology for both local and international students. The hospital has a 38 bed-capacity eye ward with 700 – 1000 in patients annually and runs an eye clinic with an average turnover of 1500 patients in a month. An estimated 50 to 70 patients undergo elective and emergency ocular surgeries per month in the eye unit.

3.2 Study Design

Retrospective case series

3.3 Study Population

All patients seen in the eye unit at KNH from September 2002 to September 2012.

3.4 Sample population.

Patients who had undergone eye removal in Kenyatta National Hospital during the study period from September 2002 to September 2012. Data for more than 10 years could not be retrieved since records are only kept for 10 years.

3.5 Sample size

An estimated number of 6 patients undergo eye removal in KNH per month which translates to 760 patients in 10 years (from the KNH Hospital records). Sample size calculation was done using the following sample size formula for finite (small) population.

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

Where

n' = sample size with finite population correction,

N = size of the population = 760 (estimated number of patients undergone eye removal according to the Kenyatta Hospital theatre registry book for 10 years)

Z = statistic for 95% level of confidence

P = estimated prevalence of most common eye removal indication - orbital tumors - 54.7%

d = margin of error = 5%

n= 252

The estimated sample size of 252 was expanded to 277 to allow for 10% possible missing information

3.7 Study Period

	2013							2014			
Activities	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Proposal development											
Research and Ethical Committee approval											
Data collection											
Data analysis											
Report writing											
Thesis Defence											
Dissemination of findings forums											

Figure I: Outline of stages in preparation of dissertation

3.8 Inclusion and exclusion criteria

3.8.1 Inclusion criteria

All the patients who had undergone removal of the eye(s) at KNH.

3.8.2 Exclusion criteria:

- Patients who had undergone eye removal surgery elsewhere because one is a sure the technique of eye removal and available of the data.
- Patients with incomplete or missing medical records.

3.9 Data Collection and Management

3.9.1 Data collection

- Data collection period was between 9th December 2013 - 6th January 2014
- Data was collected from the patients' files with the assistance of records officers working at records office. They provided a list of patients who had undergone eye removal.
- Files were retrieved and records of patients who met the inclusion criteria were included in the study. The information was entered in a questionnaire

3.9.2 Data Analysis

The Information collected was transferred from the questionnaires and entered into a Microsoft Excel database, coded, and transferred to STATA version 11 software (Corp, USA) for analysis. Descriptive analysis was used to describe the indications of eye removal. Trends and patterns of eye removal were observed in terms of the distribution and variations in gender, ages and occupation. Agreement between diagnostics was compared using kappa statistics (Altman, 1991).³³ Kappa statistics value close to zero indicates no agreement while a value close to one indicates good agreement. Age was categorized as either child (<16 years) or adult (>16 years) as per the UNICEF guidelines. P-value of 0.05 was used to test the statistical significance.

4.0. Ethical consideration

The proposal was submitted to the KNH/UON ethics and research committee for approval. Patients' information confidentiality was strictly observed by coding patients' names and using the codes instead of names for reference.

The information and the questionnaire were only accessible to the investigators and the statisticians.

CHAPTER FOUR

RESULTS

A total of 281 eye removals were analyzed from 261 patient files within the study period where 20 patients had bilateral eye removal as shown in figure 1.

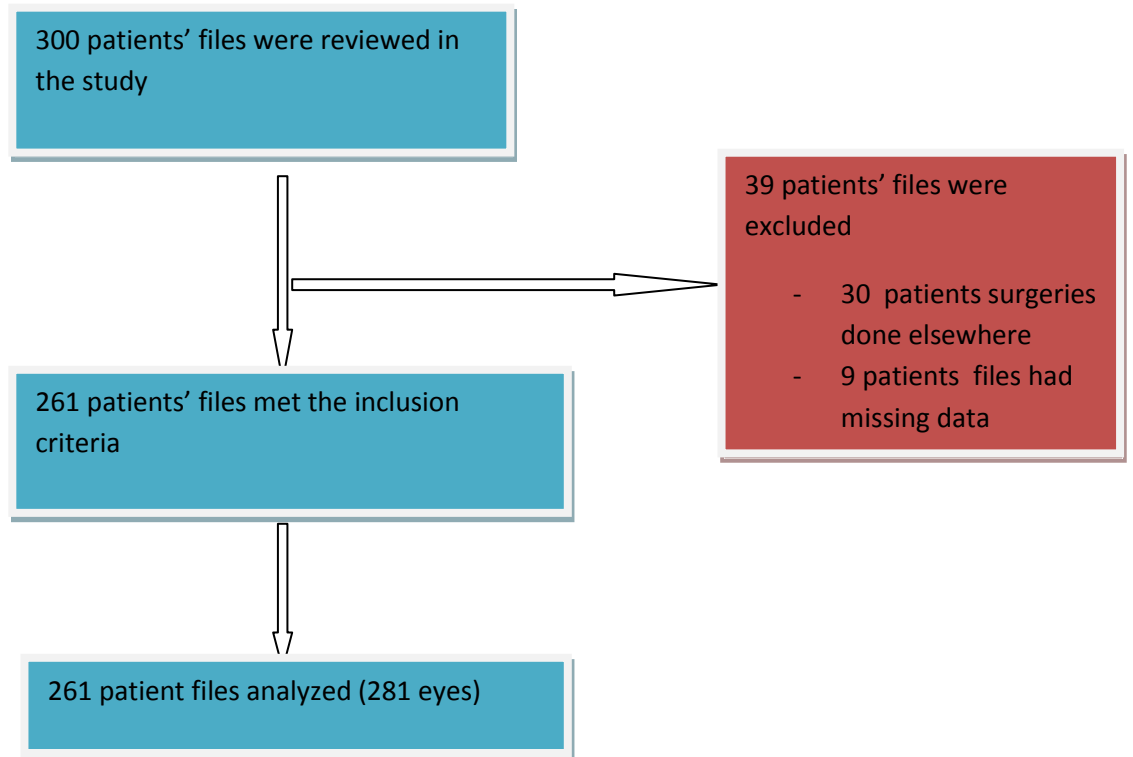


Figure II: Flow diagram for reviewed records during the study period

5.0: Demographic data

5.1: Gender Variation

Most eye patients were male (59.77%) compared to females (40.23%). The male to female ratio was 1.5: 1 with a higher predilection for male gender (p-value <0.001) as shown in figure 3.

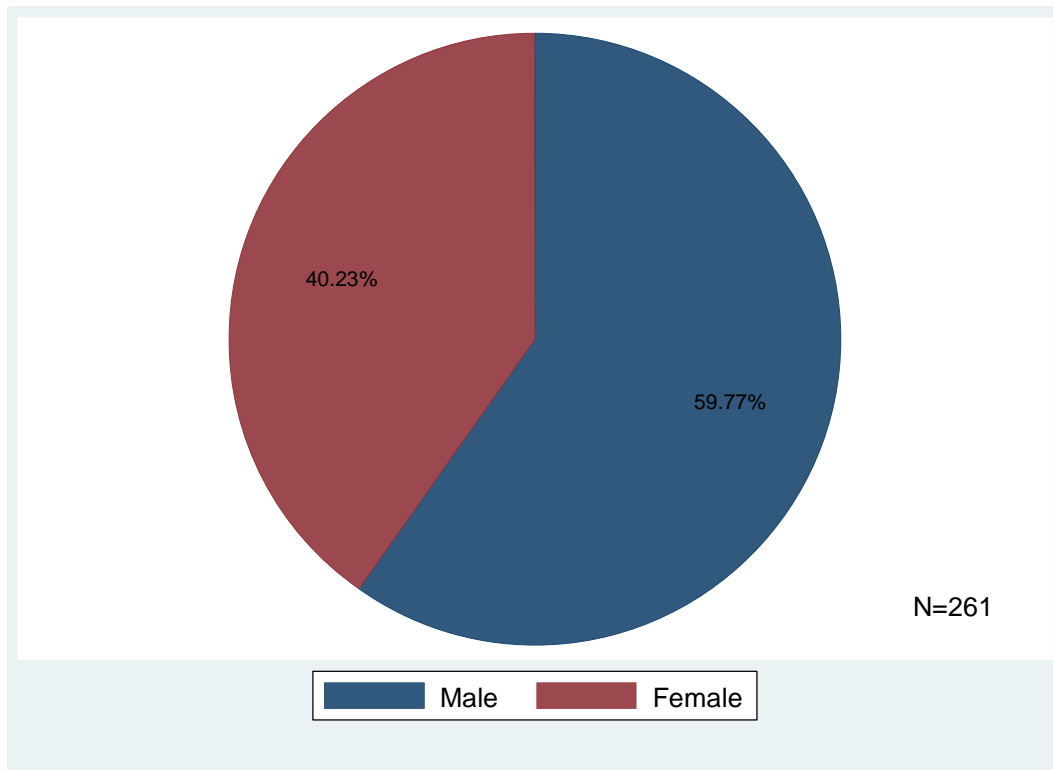


Figure III: Gender variation among the patients.

5.2: Age distribution

The mean age of patient was 22.80 years, SD 23.17, ranging from 5 days to 95 years, median age was 14 years.

Most eye removals were in patients aged between one to ten years (41.76%), followed by patients in age group 31 – 40 years (16.48%). The least age group was 71 years and above (3.83%) as shown in figure 4.

The Interquartile range (IQR) for the age distribution was $38-2.5=35.5$ years.

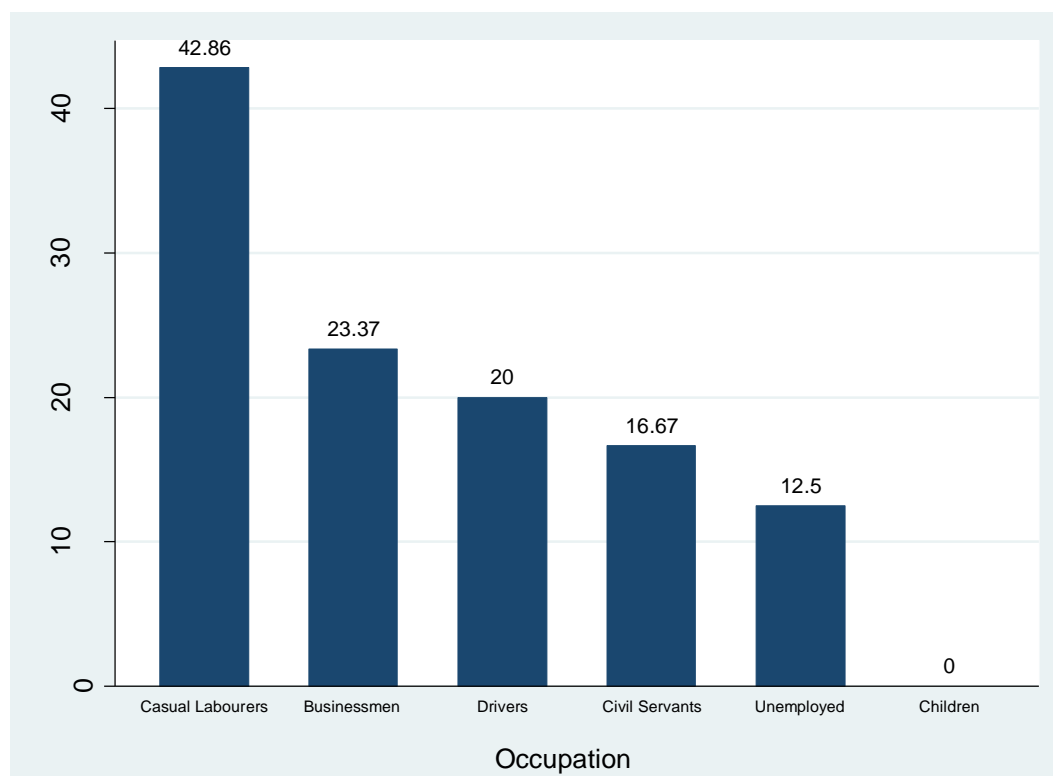


Figure IV: Age groups of the respondents' N=261

5.3: Patterns of eye removal according to laterality

Most eyes removed were right eyes 135 (48.04%).

There was a statistically significance difference between unilateral and bilateral of eyes removed (p-value<0.001) but the P-value between RE and LE was not statistically significant (p-value 0.2187) as shown in table 1.

Table 1: Laterality

Variable, N=281(Eyes)	n (%)
RE	135 (48.04%)
LE	106 (37.72%)
BE	40 (14.23%)

5.4: Occupational distribution

Children were among the highest affected at 52.11%, followed by the Unemployed (21.46%) and the least affected were the drivers (1.92%) as shown in figure 5.

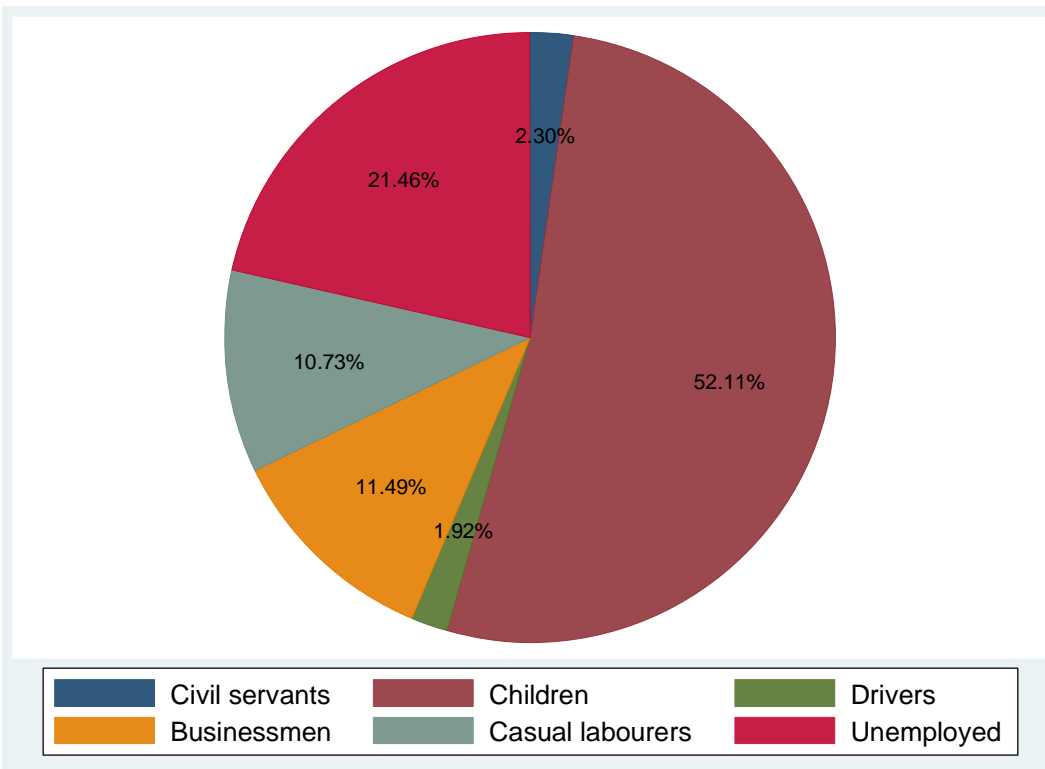


Figure V: Occupation of the respondents

5.5: Prior intervention

For the retinoblastoma patients who underwent eye removal, only 8.04% had chemo reduction before the surgery while all trauma patients admitted received intravenous antibiotics (10.73%) as shown in table 4.

134 (51.34) patients had no intervention prior to removal of the eyes.

Table 2: Intervention prior to surgery N=261(patients)

Diagnosis	No.	Intervention given	Number of patients given intervention	(%)
Retinoblastoma	108	Chemo reduction	21	8.04
Squamous cell carcinoma	47	Pre-biopsy	47	18.01
Rhabdomyosarcoma	3	Chemotherapy	3	1.15
Trauma	28	Antibiotics*	28	10.73
Infections				
Endophthalmitis	21	Antibiotics*	21	8.04
Panophthalmitis	4	Antibiotics*	4	1.5
Painful blind eye	3	Retro bulbar alcohol	2	0.77
		Chlorpromazine	1	0.38
Others	134	No intervention needed	134	51.34

*antibiotics included intravenous, topical and intravitreal.

5.6: Patterns/ trends of cases

Between 2004 - 2012 the number of enucleations and eviscerations done per year increased as compared 2002 - 2004 although the rate of exentration remained relatively the same throughout the period.

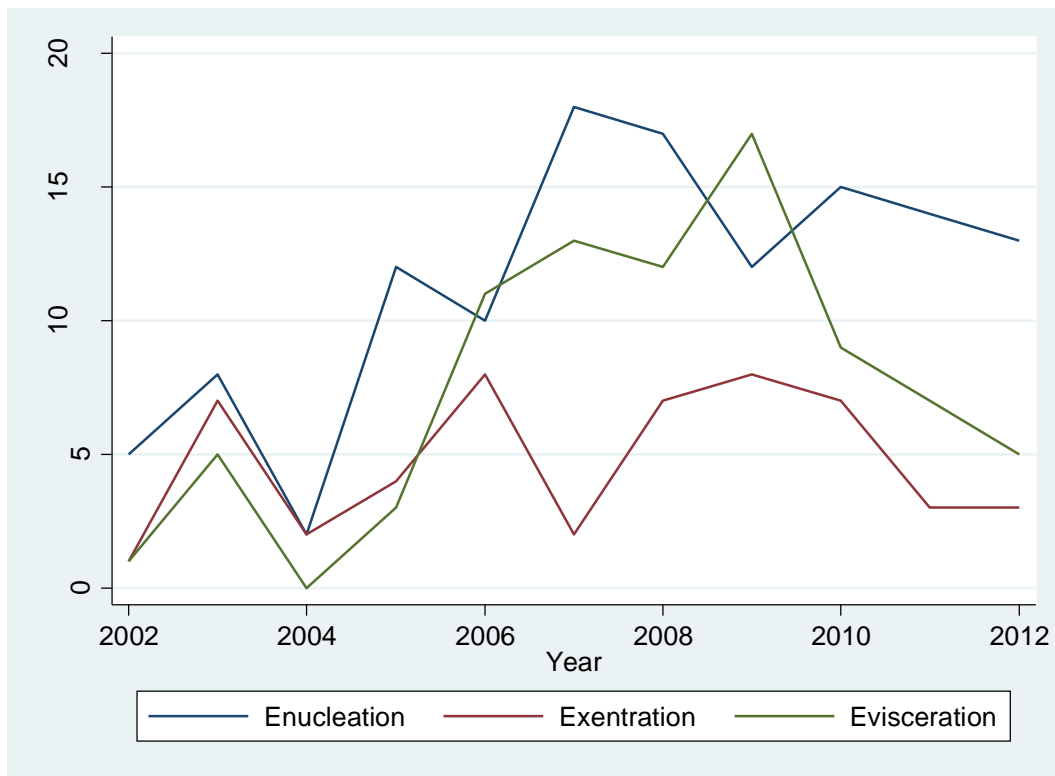


Figure VI: Patterns/trends of cases

NB: Most of the files between 2002 and 2004 were missing from the records in KNH.

5.7: The procedure versus indication

Table 3: Procedure and Indications N=281

Procedures	Indications	n (%)
Evisceration	Ruptured globe	29 (10.32)
	Endophthalmitis	21 (7.47)
	Painful Blind Eye	1 (0.36)
Enucleation	Retinoblastoma	119(42.35)
	Staphyloma	9(3.2)
	Malignant Melanoma	5(1.78)
	Panophthalmitis	4(1.42)
	Painful Blind Eye	2(0.71)
	Coat's Disease	2(0.71)
	Rupture Globe	1(0.36)
	Endophthalmitis	1(0.36)
	Pthysis Bulbi	1(0.36)
	Optic Nerve Glioma	1(0.36)
	Hamartoma	1(0.36)
	Neuroblastoma	1(0.36)
	Benign Cystic Teratoma	1(0.36)
Exenteration	Squamous Cell Carcinoma	71(25.27)
	Rhabdomyosarcoma	4(1.42)
	Anaplastic Carcinoma of Lacrimal Gland	3(1.07)
	Adenocystic Carcinoma of Lacrimal Gland	1(0.36)
	Pseudotumor	1(0.36)
	Undifferentiated Sarcomatoid (Metastasis)	1(0.36)
	Lymphangioma	1(0.36)

5.8: Type of Surgery done by gender N=281

The commonest eye removal procedure done at Kenyatta national hospital was enucleation, followed by exenteration with evisceration being the least done procedure.

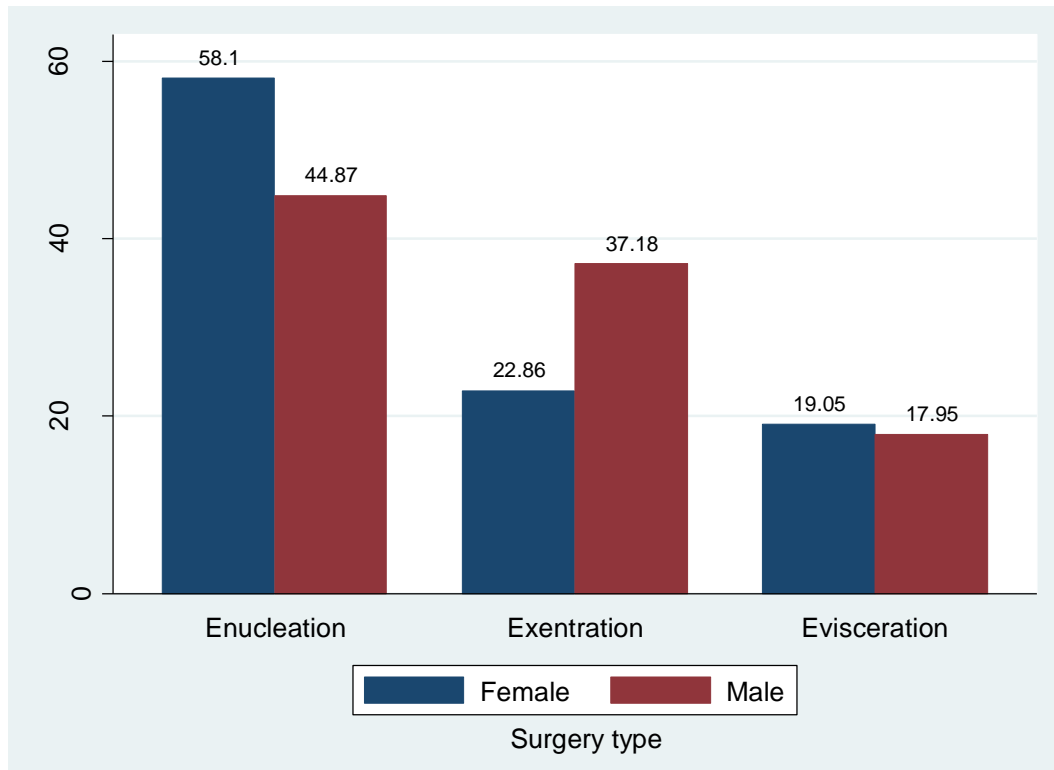


Figure VII: Type of surgery done

There were more female patients (58%) who had undergone enucleation compared to male patients (44.87%) whereas there were more male patients (37.18%) who had exenteration compared to female patients (22.86%). For the evisceration surgery the proportion of male and female patients was almost equal

5.9: Trauma (eviscerated patients) patients by occupation N=28

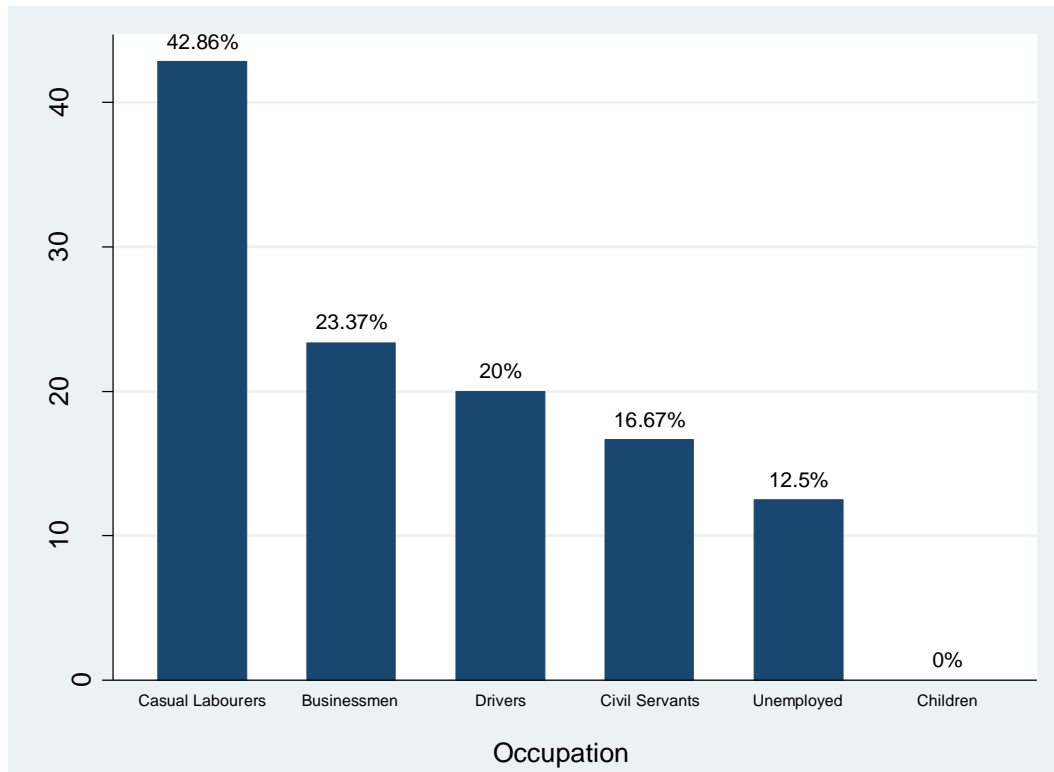


Figure 8: Occupational distribution by trauma

Predominant were casual laborers, followed by businessman and least was drivers and no child had evisceration in this study.

5.10: Indications of eye removal by clinical diagnosis.

Table 4: Etiological classification (clinical diagnosis) and Histopathological diagnosis.

Etiological classification (clinical diagnosis) N=281		Histopathological diagnosis N=217	
Classifications,	n (%)	Diagnosis	n (%)
Tumors			
Retinoblastoma	119 (42.35%)	Retinoblastoma	115 (53.00%)
Squamous cell carcinoma	71 (25.27%)	Squamous cell carcinoma	68 (31.33%)
Rhabdomyosarcoma	4 (1.42%)	Rhabdomyosarcoma	2 (0.92%)
Other neoplasms*	18 (6.40%)	Malignant melanoma	7 (3.23%)
Total	212 (75.44%)	Anaplastic carcinoma of lacrimal gland	5(2.30%)
Trauma		Coats disease	3 (1.39%)
Ruptured globe	30 (10.68%)	Adenocystic carcinoma of lacrimal gland	1 (0.46%)
Infectious		Pseudotumor	1 (0.46%)
Endophthalmitis	22 (7.83%)	Lymphangioma	1 (0.46%)
Panophthalmitis	4 (1.42%)	Optic nerve glioma	1(0.46%)
Degenerative Disease			
Staphyloma	9 (3.20%)	Staphyloma	9 (4.15%)
Others*		Neuroblastoma	1 (0.46%)
Painful blind eye	3 (1.07%)	Undifferentiated sacomatoid carcinoma	1 (0.46%)
Phthisis bulbi	1 (0.36%)	Benign cystic teratoma	1 (0.46%)
		Hamartoma	1 (0.46%)

*Other Neoplasms are Malignant Melanoma, Lymphangioma, Optic Nerve Glioma, Neuroblastoma, and Adenocystic Carcinoma of Lacrimal Gland, Anaplastic Carcinoma of Lacrimal Gland, Undifferentiated Sacomatoid Carcinoma, Benign Cystic Teratoma and Hamartoma

64 eyes did not have a histopathological diagnosis, these include ruptured globe, endophthalmitis/panophthalmitis, painful blind eye and phthisis bulbi.

5.11: Indications for eye removal: clinical diagnosis versus age

The largest proportion of patients who underwent eye removal was from the age group between one and ten years (90.83%). However, the highest cases of trauma occurred between the ages 21-30 years (52.17%) as shown in Table 5. Across all age groups, tumor was the leading common cause of eye removal

Table 5: Causes by clinical diagnosis according to age groups

Causes	Age-groups N=261								
	<1 N=20	1-10 N=109	11-20 N=7	21-30 N=23	31-40 N=43	41-50 N=23	51-60 N=16	61-70 N=10	>71 N=10
Tumors	18(90.0)	99(90.83)	2(28.57)	8(34.78)	30(69.77)	16(69.57)	10(62.50)	6(60.00)	8(80.00)
Trauma	0	0	0	12(52.17)	9(20.93)	4(17.39)	2(12.50)	1(10.00)	0
Endophthalmitis	0	5(4.59)	1(14.29)	1(4.35)	4(9.30)	2(8.70)	3(18.75)	3(30.00)	2(20.00)
Staphyloma	1(5.00)	3(2.75)	3(42.86)	0	0	0	0	0	0
Painful blind Eye	0	1(0.92)	0	1(4.35)	0	0	1(6.25)	0	0
Panophthalmitis	0	1(0.92)	1(14.29)	1(4.35)	0	1(4.35)	0	0	0
Phthisis bulbi	1(5.00)	0	0	0	0	0	0	0	0

5.12: Reasons for eye removal: Clinical diagnosis versus sex

The findings in Table 5 show that tumor was the highest common indication for eye removal (197, 75.48%) among the patients and was higher among male patients (76.92%) compared to females (73.33%). Among the female patients, endophthalmitis was the common indicator for eye removal (11.43%) compared to male patients (5.77 %).

There was no statistical significance difference between gender and any of the causes of eye removal in Kenyatta National hospital (Table 6).

Table 6: Distribution of indications by gender

Variable	Frequency	%	SEX				p-value
			FEMALE, N=105		MALE, N=156		
			N	%	N	%	
Tumors	197	75.48	77	73.33	120	76.92	0.5094
Trauma	28	10.73	9	8.57	19	12.18	0.3566
Endophthalmitis	21	8.05	12	11.43	9	5.77	0.0999
Staphyloma	7	2.68	4	3.81	3	1.92	0.3559
Panophthalmitis	4	1.53	2	1.90	2	1.28	0.8068
Painful blind eye	3	1.15	1	0.95	2	1.28	0.6886
Phthisis bulbi	1	0.38	0	0	1	0.64	-

5.13: The agreement between the clinical diagnosis and histopathological diagnosis

Table 7: Agreement between clinical diagnosis and histological diagnosis

Parameter	Agreed		Disagreed		Kappa value (95% CI)
	No. of cases	%	No. of cases	%	
Clinical and histological diagnosis	243	93.10	18	6.9%	0.83 (0.78 – 0.88)

The agreement between clinical diagnosis and histopathological diagnosis was 93.10% (95% CI: 87.52-94.64; Kappa value=0.83). Only 18 cases (6.9%) of clinical diagnosis were not in agreement with histopathological diagnosis.

Table 8: Breakdown of cases which had no agreement between Clinical and Histological Diagnosis N=18

Original Clinical Diagnosis	Eventual Histological Diagnosis
6 cases of SCC	3 cases of Anaplastic Carcinoma of Lacrimal gland 2 cases Malignant Melanoma 1 case of Rhabdomyosarcoma
5 cases of retinoblastoma	2 cases Coat's Disease 1 case of Neuroblastoma 1 case of Hamartoma 1 case of Staphyloma
3 Cases of Rhabdomyosarcoma	1 case of Teratoma 1 case of Optic Nerve Glioma 1 case of Undifferentiated Sarcomatoid
2 cases of Endophthalmitis	2 cases of retinoblastoma
1 case of Pseudotumor	1 case of SCC
1 case of Staphyloma	1 case of Coat's Disease

CHAPTER FIVE

DISCUSSION

The study sought to review the indications for eye removal at KNH, the largest referral hospital in Kenya. A total of 261 eye removals in the period from Sept 2002-Sept 2012 were recruited, of whom (59.77%) were male and (40.23%) female, with a ratio of 1.5:1. 40 (14.23%) were bilateral disease and 241(85.76%) were unilateral disease.

In this study, enucleation was the most performed procedure in (50%) followed by exenteration (31%) and the least was evisceration (18%). Similar study by Marina Gondi done in 1987, found enucleation to be (53.7%) the most performed surgical procedure followed by exenteration (31.3%) and lastly evisceration (14.9%).²⁴ This is similar to findings in our study but another study done by Chinda et al in Nigeria found, the most performed surgical procedure was evisceration (54.7%) followed by enucleation (24.1%) and lastly exenteration (21.2%).³⁰ Ocular tumors were the most predominant indications of eye removal with retinoblastoma being the commonest tumor (42.35%). Other tumors included squamous cell carcinoma (25.27%) and rhabdomyosarcoma (1.42%). In another similar study by Pandey in Nepal, they reported high rates of eye removal being attributed to retinoblastoma.²

For retinoblastoma patients who underwent enucleation, 8.04% had presented late and had to receive chemo reduction. The delay in detection or seeking treatment may be due to a number of factors: low socioeconomic status; the level of education of the parents and even limited access to health facilities.

Most eye removal was in patients aged below 10 years (49.42%), predominantly due to retinoblastoma. A study by Vemuganti in India also recorded high frequency of enucleation in children below 15 years of age who constituted 85.2% of cases and the majority was as a result of ocular tumors.³¹

Exenteration in our study constituted 31.16% of all cases and this is much higher than in a study by Gondi in KNH who found 5.9%. The main indication for exenteration in our study was squamous cell carcinoma (25.27%) compared to findings of Gondi where only 5.9% cases were due to squamous cell carcinoma.²⁵ A study in Manchester by Rahman, showed the main indication for exenteration to be basal cell carcinoma (65%) followed by malignant melanoma with squamous cell carcinoma being the least common indication for exenteration.²⁷ In this study there were no cases of Basal Cell Carcinoma (BCC), however the cases for malignant melanoma were 1.92%. These findings therefore show that the cases are rare in African races as was found in Gondi's study.²⁵ Exenteration is currently common due to higher prevalence of squamous cell carcinoma in the setting of HIV/AIDS in this region.

Trauma was responsible for only 10.7% of eyes removed in our study due to ruptured globe, this is comparable to the study done by Gondi et al (10.2%). In Ghana, removal of eyes secondary to ocular trauma was found to be higher and responsible for 35.7% of the eyes removed³⁰. This is similar to a study by Davanger M et al in Uganda where trauma was found to be the predominant indication of eyes removed (50.7%).²⁰ The variation may be due to the occupational variations in different regions. In our study, the slightly lower frequency of removal of eyes due to trauma may be due to protective safety precautions such as use of helmets and goggles by workers at risk. In our study, trauma was more common in males (12.2%) than females (8.6%) and the higher numbers of trauma occurred between the age groups 21-30 years. This can be explained by the fact that males are at higher risk to trauma than females as shown by Mpyet et al study in Niger.²⁹

Endophthalmitis and panophthalmitis as causes of eye removal occurred in 9.25% of cases in our study. Davanger et al in Uganda found 6.3% of eyes removed were as a result of endophthalmitis/panophthalmitis.²⁰ In Ghana, endophthalmitis/panophthalmitis was responsible for 47.9% of cases, followed by trauma 23.2% and neoplasms 5.1%.¹ This is similar to findings in Nepal where endophthalmitis/panophthalmitis constituted 78.6% of cases of eye removal and trauma 21.3%.²

Previously, staphyloma was found to contribute 7.3% of eyes removed in Kenyatta as found by Gondi. Currently there is a significant decline in staphyloma as cause of eyes removed as shown in our study where of all the cases only 3.20% were due to staphyloma. In a study by Pandey in Nepal, 4.9% of eyes removed were due to staphyloma.² This decline might be due to availability of alternative prevention modalities for example bandage contact lens.

Removal of the eye as a result of painful blind eye was low in our study (1.15%). This shows a significant drop as compared to findings by Gondi et al who found 14.7 % of the eyes removed were due to painful blind eye. In Nigeria the proportion of eyes removed due to painful blind eye was 7% higher than in our study.³⁰ The drop in our study might be due to the introduction of conservative interventions such as the use of retrobulbar alcohol and cytotocophotocoagulation which has been found to relieve pain, hence no destructive surgeries are required.

Phthisis bulbi was responsible for only 0.38 % of eyes removed in our study compared to 2.9% in the earlier study by Gondi et al.²⁵ The findings of our study was close to a study by Chinda et al in Nigeria who found that 1.4% of the eyes being removed were due to Phthisis bulbi.³⁰ The reduction in the number of cases might be due to the fact that most of those eye injuries were not justified for evisceration to be done.

There was significant difference in the timings of the intervention between different causes of eyes removal. Trauma related injuries were more likely to be taken to theatre for surgery earlier than neoplastic diseases whereby other treatment modalities had to be employed for example chemo reduction before theatre.

Finally, in our study, we found the agreement between clinical impression and final histopathological diagnosis to be high (Kappa value=0.83; 95CI: 0.78-0.88). In 243 eyes (91.57%) out of 261 cases, the clinical diagnosis was accurate. The findings were almost similar to a study by Gondi who found that there was a high agreement between clinical and histological diagnosis.²⁴

Conclusions

1. Tumors were still the commonest indications of eye removal at KNH.
2. Painful blind eye and phthisis bulbi are now rarely indications for removal of eyes in KNH.
3. Enucleation was the commonest procedure for eye removal followed by exenteration and evisceration.
4. The number of enucleations and eviscerations done per year increased, although the frequency of exenteration remained relatively the same throughout the period.
5. The most frequent indication for eye removal in young patients was retinoblastoma. Most patients with trauma were between 21-30 years of age and were mainly casual laborers. There was a high agreement (correlation) between clinical and final histopathological diagnosis.

Recommendations

1. To encourage clinicians to continuously liaise with histopathology department to correlate their clinical diagnosis with pathological findings. This will ensure adjustment of their management in the few cases where the clinical and histopathological findings are not similar.
2. All specimens should be taken for histology irrespective of what the clinical diagnosis was.
3. KNH should improve in their keeping records to computerize all the patients file.

Limitations

1. Some files were missing histopathology reports.
2. Tracing files was a challenge due to poor record keeping in KNH records office.
3. Most of the files between 2002 and 2004 were missing

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APPENDIX I:QUESTIONNAIRE

Section A: Demographic Information

- 1. Age
.....
- 2. Sex
a) Male b) Female
- 3. a) Date of Admission.....
b) Date of Surgery.....
- 4. Occupation before the incidence

Section B: Clinical Records of Patients

- 1. Diagnosis at admission
.....
- 2. Intervention prior to surgery
.....
- 3. Intraoperative Diagnosis
.....
- 4. Laterality
RE LE BE
- 5. Preoperative VA
RE LE
.....
- 6. Type of surgery done
Evisceration
Enucleation
Exenteration
- 7. Histopathological diagnosis
.....

APPENDIX II: BUDGET

Item	Quantity	Unit cost) (Kshs)	Total kshs
Printing and Packing	40 pages	10	400
Photocopy of Proposal	80 pages	3	240
Binding Proposal	3 copies	120	360
Proposal Printing 2 nd draft	40 pages	10	400
Photocopy of proposal 2 nd draft	80 pages	3	240
Binding of proposal 2 nd draft	3 copies	150	450
Ethics			2,000
Sub-total			4,500
Contracted services			
Statistician	1	50,000	50,000
Research assistants	3*1000*28days	84,000	84,000
Sub-totals			134,000
Communication			
Telephone			4,000
Miscellaneous			1,500
Subtotal			5,500
Results			
Printing of questionnaire	2pages	10	20
Photocopy of questionnaire	3*720 pages	3	6,480
Printing of results (black & white)	3*70 pages	10	2,100
Printing of results (color)	10*20 pages	20	4,000
Copy of final book			
Black and white	70*8 copies	3	1,680
Color copies	20*80	20	3,200
Binding of final paper	8 copies	200	1,680
Grand total		:	168,580

APPENDIX III: ETHICAL APPROVAL LETTER



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Ref: KNH-ERC/A/401 Link: www.uonbi.ac.ke/activities/KNHUoN 11th December 2013

Dr. Said Hussein Gedi
Dept. of Ophthalmology
School of Medicine
University of Nairobi

Dear Dr. Hussein

RESEARCH PROPOSAL: A REVIEW OF INDICATIONS FOR REMOVAL OF THE EYE AT KENYATTA NATIONAL HOSPITAL (P546/11/2013)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 11th December 2013 to 10th December 2014.

This approval is subject to compliance with the following requirements:

- Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
- Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
- Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
- Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
- Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website www.uonbi.ac.ke/activities/KNHUoN.

"Protect to Discover"

Yours sincerely



PROF. M.L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. Prof. A.N.Guantai, Chairperson, KNH/UoN-ERC
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The Chairman, Dept. of Ophthalmology, UoN
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