

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



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**FACTORS AFFECTING CATARACT SURGICAL OUTCOME IN THE EASTERN
REGION OF GHANA**

BY

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DECLARATION

I, Agatha Mensah-Debrah, declare that except for other people’s investigation which has been duly acknowledged, this work is the result of my own original research and that this dissertation, either in whole or in part has not been presented elsewhere for another degree.

.....

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DEDICATION

This dissertation is dedicated to my mum, Mrs Cecilia Mensah-Debrah and my Aunt Rev. Sr.

Elizabeth Amoako-Arhen.

ACKNOWLEDGEMENT

I thank God Almighty for his favour and many blessings throughout my study. I also wish to express my sincere appreciation to my supervisor Dr. Anthony Danso-Appiah for his invaluable contributions and direction.

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ABSTRACT

Background

The 2012 report from the World Health Organization stated that 285 million people have visual impairment and 39 million are blind. Cataract is the main cause of blindness globally, in Sub-Saharan Africa and in Ghana responsible for 51%, 50%, and 54.8% respectively.

Objective

The objective of this study was to assess the factors affecting cataract surgical outcome in the Eastern region of Ghana.

Methods

A cross-sectional study was employed; data was collected quantitatively and qualitatively. For quantitative data collection, hospital records of persons who had cataract surgery in eastern region from 1st January 2017 to 31st December 2017 were reviewed. Hospitals in Eastern Region with ophthalmologists were selected. A systematic random sampling method was used in selecting patient records. In total 384 records were reviewed and data abstracted using a pretested data abstraction form. For key informant interviews, 5 ophthalmologists in the region and one eye nurse from selected hospitals were interviewed for insight on factors affecting cataract surgical outcomes in the region. Cataract surgical outcome was measured using post-operative visual acuity six weeks after surgery. Data were analyzed using Stata I/C statistical package 15 and thematic framework. Regression models were used for detailed analysis to obtain crude and adjusted odds ratio; each present with a 95% confidence interval (CI).

Results

Results from this study shows that 71.6% of participants had good surgical outcome, 26.8% had borderline outcome and only 1.6% had poor outcome.

Factors identified to affect cataract surgical outcomes include post-surgical complications OR 1.72, CI 1.48-2.01. Results obtained from in-depth interviews showed that co-morbidities, inadequate optical correction, intra-surgical complications and use of traditional eye medicine were the major factors affecting cataract surgical outcome.

Conclusions

Factors affecting cataract surgical outcome are post-surgical complications, co-morbidities, inadequate optical correction, intra-surgical complications and application of traditional eye medicine. The main cause of poor outcome from cataract surgery was post-surgical complications.

Although the study showed that nearly three-quarters of patients with cataract who received surgical intervention had good post-operative visual acuity, the 1.6% with severe visual impairment has serious public health implications. It is imperative thus to put plans in place to reduce poor visual outcomes from complications arising after surgery.

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LIST OF ABBREVIATIONS

AC	Anterior Capsular
AMD	Age-related macular degeneration
BCVA	Best corrected visual acuity (with correction)
BVS	Blindness and visual impairment study
DM	Diabetes Mellitus
ECCE	Extra-Capsular Cataract Extraction
GHS	Ghana Health Service
IAPB	International Agency for the prevention of blindness
ICCE	Intra-Capsular Cataract Extraction
IOL	Intraocular Lens
IOP	Intraocular Pressure
MSICS	Manual Small Incision Cataract Surgery
PC	Posterior Capsular
PCO	Posterior Capsular Opacities
PHACO	Phacoemulsification Cataract Surgery
POST-OP	Post operation
RAAB	Rapid Assessment of Avoidable Blindness
UV	Ultraviolet rays
VA	Visual Acuity
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Cataract is responsible for majority of blindness worldwide, accounting for 51% of global blindness (Anjum et al., 2006). About 85% of those blind from cataract live in developing countries where availability or access to cataract services is poor (Anjum et al., 2006). With the global population aging and increasing in size, health and financial burden of cataract management on societies will escalate, particularly in developing countries, where cataract occurs at an earlier age and surgery is often difficult to access. In spite of the fact that cataract surgery is very safe and effective, research into causes and prevention has proved to be a major challenge for eye care experts (Brian et al., 2001).

Cataract is the cloudiness of the lens; it is a part of the eye which focuses images onto the retina for us to see. This cloudiness can cause a decrease in vision and may lead to eventual blindness (Li et al., 1999). Most cataracts are due to aging but can also develop from trauma or from exposure to UV radiation. It can also exist at birth, or occur as a complication from surgeries for other eye diseases (WHO, 2010). Risks factors for cataract are aging, diabetes mellitus, steroids, UV radiation, high myopia smoking, nutrition, family history of cataract and alcohol consumption (Allen and Vasavada., 2006).

Cataracts can be classified as age-related, congenital, or secondary (Liu et al., 2017). About 85% of cataracts are classified as senile and a significant proportion is associated with diabetes

mellitus (Brian and Taylor., 2001). Age-related cataract can be sub-grouped into cortical, posterior sub-capsular, or nuclear depending on which part of the lens it is located.

Generally, cataracts develop gradually and can be unilateral or bilateral. Cataracts can also result secondary to trauma, pre-existing systemic diseases, other pre-existing ocular diseases, other eye surgeries and continuous use of some medication (Kanski et al., 2011).

Common symptoms are blurred vision, difficulty seeing faded colors, seeing halos around white light, problems recognizing faces, discomfort with bright lights and difficulty driving at night (Allen and Vasavada., 2006).

- Age-related cataract: Lens proteins denature and degrade over time and the process is accelerated by systemic diseases like hypertension and diabetes mellitus (Liu et al., 2017).
- It is the most common type with onset between ages 45-50 years. The opacity of the lens is the direct result of oxidative stress. On the basis of the location of the opacity, senile or age-related cataracts can be divided into three type's posterior sub-capsular, nuclear and cortical. Congenital cataracts can be unilateral or bilateral depending on the underlying cause (Liu et al., 2017).
- UV radiation: exposure to UV radiation causes the lens to lose its ability to restore and protect as a result of its gene expression and some chemical processes being altered (Liu et al., 2017).
- Trauma: the lens capsule can get damaged which leads to swelling and whitening of the lens that result in cataract.

- Secondary: cataract can occur as a result of complication of other eye diseases such as retinopathy of prematurity, aniridia, uveitis, retinal detachment, retinitis pigmentosa. It can also result from surgery for other eye problems (Liu et al., 2017, Seddon et al., 1995).
- Drugs: certain medications like corticosteroids, phenothiazine or other thiazine have been discovered to have an association with the development of cataract.
- Smoking: it has been found that smoking increases the risk of developing cataract and its progression.
- Alcohol: several studies have discovered an association between cataract development and people with higher alcoholic consumption (Liu et al., 2017).
- Nutrition: Although results are inconclusive, studies have suggested an association between cataract development and the level of antioxidants (Weikel et al., 2014).

Although lens correction can be used to improve vision in the early stages of cataract development, surgery remains the only option of treatment for cataract patients.

Cataract surgery is the removal of the natural lens of the eye that has developed cataract. The main types of cataract surgeries are phacoemulsification, extracapsular cataract extraction (ECCE), intracapsular cataract extraction (ICCE) and small incision cataract surgery (SICS) (Allen and Vasavada., 2006).

- Phacoemulsification cataract surgery: it is a procedure that allows for a small, self – sealing incision that does not require sutures the lens fibers are fragmented using

ultrasound. As the natural lens is removed, it is replaced by an intraocular lens to balance the refractive power of the eye (Canfi et al., 2015).

- Extra-capsular cataract extraction (ECCE): a circular incision is made in the anterior part of the lens capsule. The lens nucleus is removed through the hole in the capsule. The cortex is aspirated out and an intraocular lens is implanted in the capsule bag (Henderson et al., 2014).
- Intra-capsular cataract extraction (ICCE) – the natural lens within the capsule is surgically removed. An intraocular lens is placed in the chamber. This method is used when there is a complete dislocation of the lens. This procedure is rarely used these days (Goes., 2013),(Ashwin et al., 2009).

Cataract surgery outcome is measured by post-operative visual acuity six weeks after surgery. WHO recommends that, visual acuity of 6/6–6/18 is classified as good outcome six weeks after surgery (proportion of good outcome with available and best correction as recommended by WHO should be >85% and >90% respectively), visual acuity of <6/18–6/60 six weeks after surgery is classified as borderline outcome (proportion of borderline outcome with available and best correction as recommended by WHO should be <15% and <5% respectively), and poor outcome is defined as a visual acuity of <6/60 six weeks after surgery (proportion of poor outcome with available and best correction as recommended by WHO should be <5% for each type) (Limburg et al., 2005). Several studies have used this grading method to monitor cataract surgical outcome in different countries (Murthy G.V et al., 2012) (Limburg H. et al., 2002) (Dandona L. et al., 2000).

1.2 Problem Statement

Globally it has been estimated that the number of people visually impaired is 285 million; 39 million blind and 246 million with low vision; 65 % of people visually impaired and 82% of all blind are 50 years and older. According to the global data, 51% of the world's blind is from cataract and most are concentrated in developing countries (Pascolini et al, 2012). Cataract is the foremost cause of blindness in Sub-Saharan Africa and accounts for 50% of all avoidable blindness (Pascolini et al., 2012).

In Ghana, cataract is responsible for 54.8% of blindness nationwide, which is a major concern for the country (Wiafe., 2015). With increasing longevity worldwide, cataract blindness is likely to increase further. It is expected to grow from 25 million cataract blind in the year 2000 to 50 million by 2020.

In 1999, WHO and IAPB (International Agency for the Prevention of Blindness) launched a global initiative (Vision 2020) to address the growing burden of blindness and visual impairment worldwide. The Vision 2020 initiative aimed at eliminating avoidable blindness by the year 2020, which has led to mass cataract operations being performed around the world especially in developing countries (Foster et al., 2001).

Increasing the number of cataract surgeries alone is not enough; there are reports of poor visual outcome after cataract surgeries from Africa, Asia, and South America (Beltranena et al., 2007). In some countries, 36% of the operated patients cannot see 6/60 or better with the correction available to them (Beltranena et al., 2007). For all cataract operations performed, poor outcomes

(VA > 6/60) have been observed in 36% of these cases (Beltranena et al., 2007). It is therefore imperative that besides increasing the number of surgeries around the country, that 80% or more of these surgeries result in good outcomes.

From literature, the most common factors affecting cataract surgical outcomes are:

The surgery technique used (PHACO, ECCE, ICCE, SICS), ocular co-morbidities (glaucoma, corneal edema, retinal detachment), complications from surgery (capsular rupture, vitreous loss, endophthalmitis), inadequate optical correction and compliance to post-op review dates.

1.3 Conceptual Framework

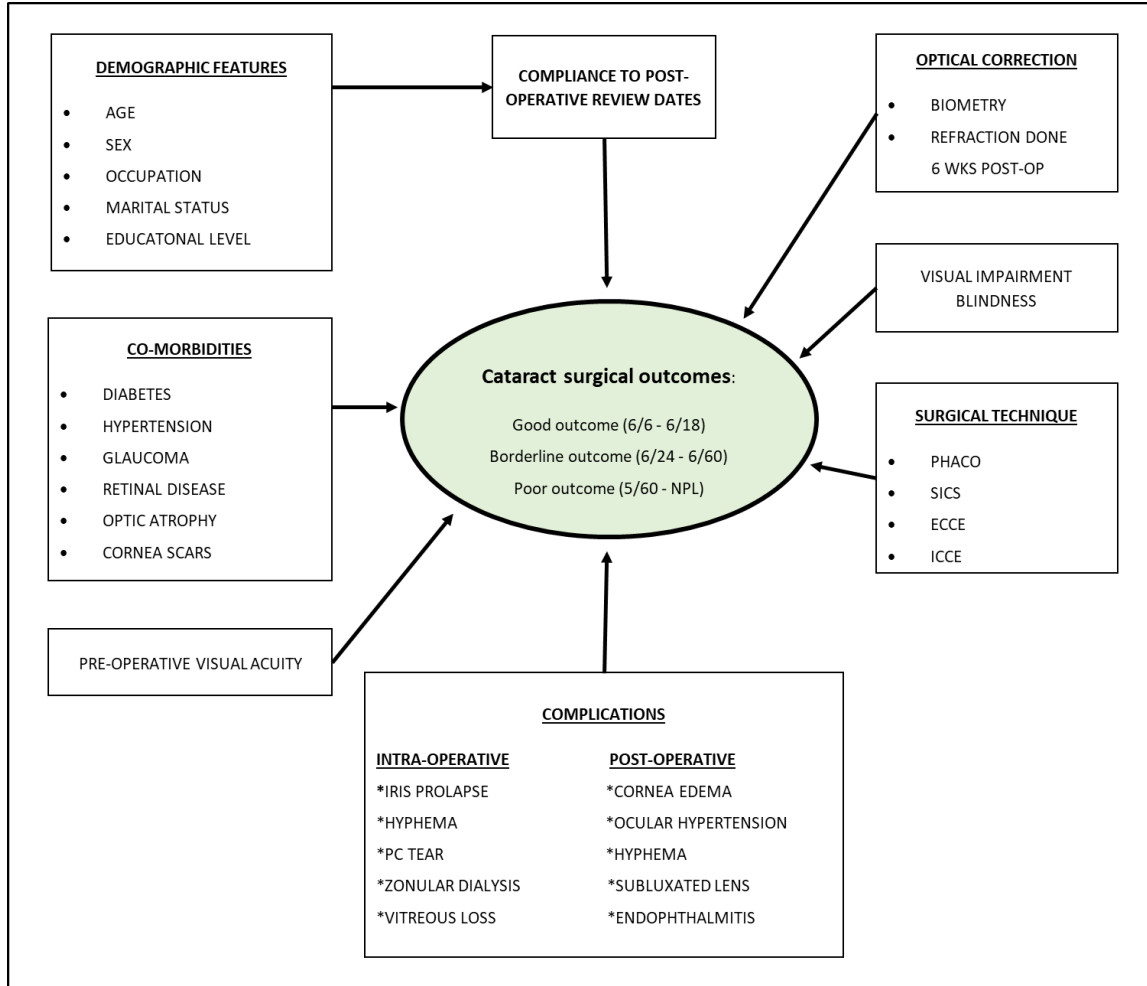


Figure 1 Factors Affecting Cataract Surgical Outcomes

Narrative of the conceptual framework

The conceptual framework in **Figure 1** depicts the factors affecting cataract surgical outcomes in the Eastern Region. Age, sex, occupation, marital status and educational level are some demographic factors that have been known to affect the development of cataract and its surgical outcomes (Foster P. J et al., 2003).

Cataract blindness usually occurs in people aged 40 years and above and has been known to develop more in females than males. UV radiation is another factor that has been linked with the

development of cataract, occupation that entails lots of outdoor work usually puts a person at a higher risk of developing cataract. Marital status and educational level are some factors linked with patients' decision to either have cataract surgery or not. World Health Organization defines cataract surgical outcome as a post-operative visual acuity six weeks after surgery.

From literature, factors identified to be associated with cataract surgical outcomes were grouped under four broad headings.

Co-morbidities (pre-existing conditions that affect vision either ocular or systemic), optical correction (biometry test to ascertain lens power required for a particular eye to achieve normal vision after cataract has been removed or spectacle correction given six weeks after surgery to correct any residual optical correction), complications (could be either during or after surgery) and surgical technique (Phacoemulsification cataract surgery, Small Incision Cataract Surgery, Extra-Capsular Cataract Extraction and Intra-Capsular Cataract Extraction).

Phacoemulsification Cataract surgery is widely known to yield the best results but very expensive while comparably Small Incision Cataract Surgery known to give visual outcome almost as good a Phacoemulsification but far less cheaper which made it the ideal technique for developing countries.

Co-morbidities are pre-existing conditions other than cataract than affect visual acuity. Depending on the extent or progression of the co-morbidity, removal of cataract will not necessarily result in improved vision especially if cataract is not the main cause of reduced vision. E.g. a patient having advanced glaucoma with central visual field loss will not benefit from any cataract surgery, therefore removing cataract from that eye will not improve patient

vision. If pre-existing condition (glaucoma) was not diagnosed before cataract surgery, poor visual outcome after cataract surgery may be attributed to the surgery instead of the glaucoma.

Intra-operative complications can result in severe damage of some parts of the eye e.g. vitreous loss, posterior capsular tear and hyphema. Post-operative complication can affect visual acuity due to damage caused to the eye after surgery.

These are all factors known to affect cataract surgical outcome or post-operative visual acuity (measurement for surgical outcome).

1.4 Justification

The significance of this study can be outlined under three broad heading: its global developmental agenda, its relevance to developmental progress in Ghana and to facilitate acquisition of data for evidence-based planning to improve the cataract surgical outcomes.

Cataract-related blindness is one of the main concerns of the WHO and International Agency for the Prevention of Blindness (IAPB), especially in relation to the Vision 2020 initiative: the right to sight. Whose goal is to eradicate avoidable blindness by the year 2020. Cataract is also the leading cause of blindness in Ghana (54.8%) (Wiafe., 2015). To achieve the Vision 2020 goal, there has been a recent uptake of cataract surgeries in Ghana.

Although population-based surveys may not reflect recent improvement in surgical techniques, they reflect what the public perceives. It is therefore imperative that besides increasing the number of surgeries in the country, that 80% or more of those surgeries will have good outcomes. Data on cataract surgical outcome in Ghana is limited and scanty at best. This study

will provide data on cataract surgical outcome in the eastern region of Ghana and the factors affecting them.

1.5 Research Question

- What proportion of cataract surgeries result in poor outcome?
- What are the determinants of cataract surgical outcome in the Eastern Region?
- What factors affect cataract surgical outcome from a provider's perspective?

1.6 Objectives

1.6.1 General Objective

To assess the major factors affecting cataract surgical outcomes in the Eastern Region of Ghana.

1.6.2 Specific Objectives

- To determine the proportion of cataract surgeries that result in poor outcomes in the Eastern region.
- To assess the determinants of cataract surgical outcomes in the region
- To identify factors affecting cataract surgical outcome from a provider's perspective.

CHAPTER TWO

2.0 Literature Review

Ten million surgical interventions are done for cataract patients globally each year (Abdull et al., 2009). Majority are done in low and middle-income countries (Abdull et al., 2009). It has been projected that by the year 2020 over 30 million surgeries will need to be done every year (Abdull et al., 2009). This is necessary to reduce the number of persons blind from cataract to less than a million. Majority of these surgeries will take place in the developing world (Abdull et al., 2009).

Socio-demographic factors

Socio-demographic characteristics for example sex, age and occupation are some factors found to be linked with poor outcomes from cataract surgery (Norregaard et al., 1998). Age is known to be linked with poor visual outcomes (Norregaard et al., 1998), with persons aged over 90 years being four times at risk of poor visual outcomes than those aged 50 to 59 years (Desai et al., 1999). A survey from Pakistan and India showed that females were linked with poor outcomes than males (Bourne et al., 2007; Murthy et al., 2001).

Another study in Trinidad and Tobago found post-operative visual acuity in males resulting in poor outcomes from cataract surgery 1.37 times more than results from the females in the study. People who were on pension, unemployed or relied on disability allowance were 1.41 times more likely to get poor outcomes from cataract surgery (Soron et al., 2015).

Proportion with poor surgical outcome

Recent population-based studies in Sub-Saharan Africa report 30% of cataract surgical outcomes as good, with the remaining 70%, impaired to poor outcomes (Lindfield et al., 2012). In Sub-

Saharan Africa, poor outcomes outnumber good outcomes by 13% and there is no correlation between cataract surgical rates and their outcomes (Lewallen et al., 2015).

In Ghana, early surgical complications occur in 10.1% of operated eyes with corneal edema being the most common followed by hyphema (Ilechie et al., 2012). Other early complications noted were high Intra Ocular Pressure, iridodialysis, dislocated Intra Ocular Lens, striate keratitis, posterior synaechia, posterior capsule tear, iritis, vitreous hemorrhage. Opacification in the posterior capsule was the most common post-surgical complication and occurred in 1.4% of eyes this was followed by vitreous loss which occurred in 0.5% of eyes. Other late complications noted were macular edema (Ilechie et al., 2012).

In Malawi, it was reported that 23.3% of cataract operated eyes result in good outcomes and 53.3% in poor outcomes (Courtright et al., 2014).

In Nigeria, 29% of cataract surgeries resulted in good outcomes and 44.1% in poor outcomes (Imam et al., 2011). Findings from a Nigerian national survey were similar to the findings of many other population-based studies from developing countries where poor outcomes (using presenting VA) range from 12% in the Philippines to 64% in Cameroon (Imam et al., 2011).

2.1 Cataract Surgical Outcomes

2.1.1 Comorbidities

Thirty eight percent of people undergoing cataract surgeries will have some form of pre-operative ocular comorbidities which includes age-related macular degeneration, glaucoma, diabetic retinopathy, high myopia, retinal vein occlusion, amblyopia and many others (Chuo et

al., 2012). In India, systemic comorbidities which included diabetes (11.5%), hypertension (26.9%) and ischemic heart disease (0.9%) were present in 37% of cataract surgical patients (Vivekenand et al., 2011).

In Nepal poor cataract surgical outcomes were attributed to uncorrected refractive error (72.9%), posterior capsular opacities (18.2%), corneal edema (3.4%), cystoid macular edema (4.5%), retinal detachment (7.9%), age-related macular degeneration (21.6%), diabetic retinopathy (9.1%), pre-existing glaucoma (10.2%) (Kandel et al., 2010).

In Spain, poor visual outcomes were mostly due to surgical complications. 10.3% from peri-operative complications and 26.63% post-operative complications, which were attributed to 2.83% posterior capsule rupture, 15.42% cornea edema and 7.34% ocular hypertension (Gonzalez et al., 2014).

Cataract and age-related macular degeneration (AMD) often present simultaneously in the elderly. The presence of AMD has been hypothesized as an important risk factor for poor visual outcome after cataract surgery. With the recent increase in AMD prevalence especially in developing countries, analysis of possible risks and advantages of cataract surgery in patients with AMD has become of importance to the world. Several studies have scrutinized the possible benefit of cataract surgery to people with AMD, however, previous studies have been restricted by the lack of a consistent grading system for AMD and cataract, in addition to people with other ocular comorbidities (Forooghian et al., 2009).

After cataract surgery, 90% of patients can attain a visual acuity of 6/12 or better (Powe et al., 1994). In patients with no pre-existing diseases, more than 95% can attain a visual outcome of 6/12 or better. Other studies have acknowledged significant progress not only in the visual outcome but also in quality of life post cataract surgery (Desai P et al., 1996), (Norregaard JC et al., 1998) and (Desai P. et al., 1999).

Cataract surgery survey organized in the U.K showed that, over one-third of participants aged 85 years and older did not get visual acuities better than 6/18 after cataract surgery (Desai P et al., 1999).

The older patients (those aged 85 years or more) were also two to three times more likely to get poorer visual outcome in one eye (visual acuity less than 6/60) than those aged less than 85 years (Minassian et al., 2000). With increased life expectancies and growing demand for improved quality of life, the number of very old patients receiving cataract surgery has been projected to increase substantially in the coming years (Minassian et al., 2000).

The presence of pre-existing eye diseases has been known to be a strong and independent contributor to poorer surgical outcomes (Desai P et al., 1999), (Westcott et al., 2000). A national cataract surgery survey in the U.K showed that patients with ocular comorbidities were 2.7 times more likely to have visual acuity worse than 6/12 than those without ocular co-morbidities after cataract surgery (Taylor et al., 2000). In a study by Schein et al showed that persons with age related maculopathy, glaucoma, or diabetic retinopathy had higher likelihood of getting poorer visual outcomes than those without any of these co-morbidities after cataract surgery (Schein et al., 1995). Not only is the quality of cataract surgery in people with age-related macular degeneration, glaucoma and diabetic retinopathy uncertain, but some evidence have suggested

that cataract surgery aggravates many of these pre-existing conditions (Schein et al., 1995). Cataract surgery has been known to increase risk in advancement of diabetic retinopathy and macular oedema development (Mittra et al., 2000).

Patients with a history of diabetes and stroke have moderate risk of attaining poor visual acuity after cataract surgery (Desai P. et al., 1999).

2.1.2 Surgical Techniques

A randomized control trial to compare different techniques (ECCE, SICS and phacoemulsification) showed high success rates with phacoemulsification (Lindfield et al., 2008). Results from a survey in UK showed that 20% of ophthalmologists were using ECCE, therefore the use of modern procedures like Phacoemulsification varies from 10% to 90% in different settings (Lindfield et al., 2008).

This visual improvement from cataract extraction could be better without the presence of other ocular morbidities that could cause blindness. This presumes that outcomes from cataract surgery be influenced by not just technique and the patient but on the eligibility of the patient for surgery.

In high-income countries, phacoemulsification has turned out to be the preferred choice for removing cataract, as it allows for quicker regaining of visual acuity as compared to removal by extra-capsular cataract extraction. Nevertheless, low and middle income countries are limited in using phacoemulsification due to the high amount of cost involved. This has made extra-capsular extraction the procedure of choice in many developing countries.

Growing concern exists over the outcomes of cataract surgery in developing countries. Some population-based surveys found that 40% – 75% of post-surgical eyes have presenting visual

acuity of 6/24 or worse, with 50% and over 5/60 or worse (Narvez et al., 2006). A small number of studies have measured outcome based on the best corrected visual acuity, although others did state that up to twenty percent of post-operative cataract surgeries had best-corrected visual acuity of <6/60 (Gilbert et al., 2010).

The use of the intraocular lens (IOL) in cataract surgical extraction has become a widespread preference. The advantages of using IOL has become of greater use in developing countries than in the high income ones (Basti et al., 1993). IOL use has led to better outcomes in cataract surgery and several randomized clinical trials have proven its safety (Allen and Vasavada., 2006).

2.1.3 Biometry

Biometry is the measure of the size and shape of the entire eye to be able to accurately predict the total dioptric power of the eye. This is necessary because of the implantation of artificial intraocular lens during cataract surgery. The formulae entail the measurement of the axial length of the eye, corneal power and anterior chamber depth (Ashwin et al., 2009).

Once ultrasonic echo-impulse techniques are used for biometry, 54% of the errors detected in selecting the right IOL power has been attributed to errors made in axial length measurement, 38% of errors are from keratometry measurement errors and 8% are from errors in the deduction of post-operative anterior chamber depth (Ashwin et al., 2009). Improving axial eye length measurement has been predicted to have a great impact on improving IOL power estimation (Ashwin et al., 2009).

Surgical complications

Increasing age is a risk factor for many cataract surgery complications (Desai P et al., 1999). Posterior capsule rupture during cataract surgery, post-operative infection, raised intraocular pressure, corneal oedema have been shown to occur in the very elderly, aged 85 years and above (Desai P et al., 1999). In a study done in Norway, elderly patients aged 90 years and older were 3.6 times more likely to get post-operative endophthalmitis (an uncommon but potentially blinding infection) than those aged under 90 years (Norregaard JC et al., 1997).

Wescott et al showed that people with no ocular comorbidity had better odds of attaining visual acuity of 6/12 or better after cataract surgery especially in those aged 60-69 years than in those aged over 80 years (Desai P et al., 1999).

In a study by Isawumi MA et al, the most common intra operative complications documented were vitreous loss (27.35%) and posterior capsular rupture (6.28%), whereas capsular opacity (6.28%) was commonest post operatively (Isawumi et al., 2009). Post-operative complications especially posterior capsular opacity was found to cause significantly poor visual outcome (Isawumi et al., 2009). With advances in technology, it's been found that phacoemulsification and manual small incision cataract surgeries achieve excellent visual outcome with lower complication rates (Isawumi et al., 2009).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

A cross-sectional study design was used and data collection was done both quantitatively and qualitatively

Quantitative study design

Data was extracted from hospital patient records. Data abstracted from hospital records included the age of the patient, pre-operative VA, type of surgical technique used, post-operative VA, diabetes status, hypertension status, pre-existing ocular comorbidities, and complications during and after surgery.

Qualitative study design

Key informant interviews were conducted to get information on factors affecting cataract surgical outcome and the causes of poor outcome from the perspective of eye surgeons and nurses providing those services.

3.2 Study Area



Figure 2 Map of the Eastern Region of Ghana Showing District Divisions

The Eastern Region of Ghana has a cataract surgical uptake rate of about 56.7% (Aekuaku-Dogbe et al, 2015).

The Eastern Region has a population of 2,706,748 according to the 2010 census

The region has 26 districts as depicted in **Figure 2**, and 136 sub-districts with 31 government hospitals of which 19 have operational eye clinics. The region has 5 ophthalmologists; and the region is divided into zones covered by each ophthalmologist.

This was a hospital-based study assessing outcomes from cataract surgeries in the Eastern Region of Ghana. The hospitals were selected based on an ophthalmologist being in residence.

The selected hospitals are listed below.

- The Regional Hospital, Koforidua New Juaben District
- St. Dominic's Hospital, Akwatia in the Kwaebibrem District

- Nsawam Government Hospital, Nsawam in the Akwapim South District
- VRA hospital, Akosombo in the Asuogyaman District
- Tetteh Quarshie Memorial Hospital, Akuapem Mampong in the Akuapem North District.

3.3 Variables

Outcome variable

Post-operative visual acuity six weeks after cataract surgery

Independent variable

independent variables are age, sex, pre-operative visual acuity, type of surgical technique, comorbidities (diabetes, hypertension, pre-existing ocular condition), complications from surgery (intra-operative and post-operative, educational level, occupation and optical correction (biometry and refraction which was done 6 weeks post-surgery).

3.4 Study population

All cataract patients who had cataract surgeries in the above-mentioned hospitals between 1st January and 31st December 2017 were eligible for inclusion in this study.

For qualitative data ophthalmologists and ophthalmic nurses were purposively selected one each from the 5 facilities. Cataract surgeries done before 1st January 2017 and after 31st December 2017 were excluded from the study.

3.5 Data Collection methods

Data collection was through key informant interviews and patient record review with a document schedule/data sheet.

3.5.1 Patient record review with document schedule/data sheet

Records of four hundred and forty seven (447) patients were reviewed with a data sheet. This was done with the support of trained ophthalmic nurses. The records extracted for each patient was reviewed for completeness. Sixty-three of the records found to be incomplete were discarded leaving a total of three hundred and eighty-four (384) records for analysis. The completed data sheets were collated and data entry and analysis done with STATA 15.

3.5.2 Key informant interviews

The researcher conducted ten (10) key informant interviews. This included two key informants from each of the five hospitals included in the study. Each of the respondents was purposively selected. The interviews were conducted in person and digitally recorded with prior permission from the respondents. The respondents were allowed to express themselves on each question freely. The researcher periodically asks questions for clarity. Each interview took an average of one and half hours.

3.6 Sampling method

3.6.1 Quantitative

According to the Ghana National Eye Care Secretariat's data register, 1028 cataract surgeries were performed in the Eastern Region in 2016. From the literature, the expected true proportion is 41.2% (Ilechie et al., 2012).

Sample size calculated using the formula in Error! Reference source not found.:

Figure 3 Showing Formula Used In Calculating the Sample Size

Accounting for about 20% (75) incomplete data, 447 patients' records were sampled

Systematic random sampling was used. A sample frame was created by listing all 1028 names of patients who had cataract surgery from included facilities between 1st January to 31st December 2017 were listed alphabetically starting with their first names. Sample interval (K=2) was used based on the calculation of $K=1028/447$. Every 2nd name on the list was selected as part of the sample population.

Five eye nurses were trained as data collectors on how to extract needed data from patient records. The eye nurses (data collectors) were recruited from the five included facilities. Data collectors were asked to send list of all patients who received cataract surgery in their respective facilities in 2017. All five lists were put together and patient names were sorted alphabetically starting with their first names to create a sample frame. Every second name on the list was selected as part of the sample population.

Each facility was allotted a percentage based on the number of cataract surgeries done in 2017. E.g. facility A did 60 cataract surgeries in 2017 which means the percentage allotted to facility A was $60/1028= 5.84\%$

The number of sample population selected for each facility was dependent on the percentage allotted (based on the number of surgeries done in 2017). E.g. with facility A contributing only 5.84% of the total sample frame (1028), the number of participants selected from facility A was 26 which was 5.84% of the total sample population of 447.

Each data collector was then sent the sample list allotted for their facility for data extraction.

Hard copies of completed questionnaires were sent to principal investigator which was entered into a pre-designed excel spread sheet.

After 447 records were submitted, 63 records had to be excluded due to incomplete data leaving a total of 384 records as the remaining sample population.

3.6.2 Qualitative

Purposive sampling was used to select 10 participants, 2 from each selected facility. All five ophthalmologists and eye nurses from selected hospitals were included. Interviews were conducted using an interview guide with open ended questions and responses recorded digitally.

Permission was sought from the ten key informants prior to interview day. Interview dates and time were decided by key informants and appointments booked for said dates. On interview day, participants were given information sheets which explained reason for the study and interview process. They were also informed their responses being recorded. Participant consent was sought before interviews were conducted.

3.7 Data Collection techniques and tools/instruments

3.7.1 Document Schedule/data sheet

A document schedule was used in the quantitative data collection. The document schedule had four sections: socio-demographic characteristics of patients, preoperative examination findings of patients, surgical procedure and postoperative complications.

3.7.2 Key informant interview guide

The key informant interview guide was the main tool used for the qualitative data collection in this study. The guide was designed in English and covered areas such as protocol for cataract surgeries, factors affecting cataract surgical outcomes, common causes of poor cataract surgical outcomes, areas for improvement in cataract surgeries, availability of monitoring tools, and their routine use.

3.8 Quality Control

The interview guide and document schedule were designed in English and pretested in Begoro District Hospital, a facility also located in the Eastern Region. The difficulties and defects found following the pretesting were used to revise the document schedule and interview guide. The final schedule and guide were evaluated for validity and internal consistency. Cronbach's alpha was used in checking for internal consistency.

Research assistants were chosen from selected facilities. The research assistants (eye nurses and optometrists) were trained on how to fill the questionnaire accurately. Data was checked daily for errors and necessary corrections carried out. Interviews were conducted by the principal investigator. Qualitative data was transcribed by principal investigator.

The data that was collected was saved in an external drive with adequate password protection to ensure data security and prevent data loss.

3.8.1 Training of data collectors

A training session was organized for all data collectors. They were subsequently accompanied to apply the document schedule on the field during the pretesting. The lessons learned during the pretesting were used to retrain the interviewers.

3.9 Data Processing and Analysis

3.9.1 Quantitative data processing and analysis

Quantitative data was computed into excel and imported into STATA 15 for analysis. Logistic regression models were used for detailed analysis to obtain the crude and adjust odds ratio. 95% confidence interval was used.

3.9.2 Qualitative data processing and analysis

Content analysis was used to analyze qualitative data, this method was chosen because it allows for the collection of specific information on theoretical ideas to be expanded on. Transcribed data was read and re-read twice to acquaint myself with its content. Data was organized based on questions from interview guide. Responses from interviews were put into categories based on similarity, repetition and the conceptual framework groupings e.g. co-morbidities, post-surgical complications, inadequate lens correction and intra-surgical complications. Two categories were added based on responses not falling under any of the conceptual framework groupings.

Categories were tabulated based on their frequency, with the highest at the top. Analysis was repeated twice to improve quality of data

3.9 Ethical Consideration

Ethical approval was given by the Ghana Health Service Ethical Committee through the School of Public Health. Permissions were sought from the management of the selected hospitals. All data was handled with strict confidentiality. Digital data was password protected. Raw data was destroyed by shredding all hard copies of questionnaire one year after analysis. Study participants for qualitative data were given information sheet to inform their decision to either participate or withdraw from the study. Participants were reassured that participation was strictly voluntary.

3.9.1 Pretesting Of the Questionnaire

Questionnaires were pretested at the Eye Clinic at the district hospital in Begoro. This was done to evaluate the time needed to collect and fill in the information for each questionnaire and to assess the accuracy of secondary data.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic Distribution

Table 1 shows the demographic distribution of study participants by age, sex, occupation and district. Of the 384 participants included in our study, 63% were females and 37% were males. 32.6% of participants were aged between 70-79 years with a few below 40 years. 42.5% of participants are retired, 35.4% are farmers and 18.0% were into some form of trading.

Table 1 Patient Demographic Characteristics

Demographic Data	Freq	%
	N=384	100
Age Range		
10-19	1	0.3
20-29	0	0.0
30-39	1	0.3
40-49	19	4.9
50-59	69	18.0
60-69	104	27.1
70-79	125	32.6
80-89	60	15.6
>90	5	1.3
Gender		
Male	142	37.0
Female	242	63.0
Occupation		
Farmer	136	35.4
Trader	69	18.0
Teacher	8	2.1
Driver	5	1.3
Mechanic	1	0.3
Student	2	0.5
Retired	163	42.5
Districts		
Kwaebibrem	214	55.7
New Juaben	55	14.3
Akwapim south	42	10.9
Akwapim north	22	5.7
Asuogyaman	51	13.3

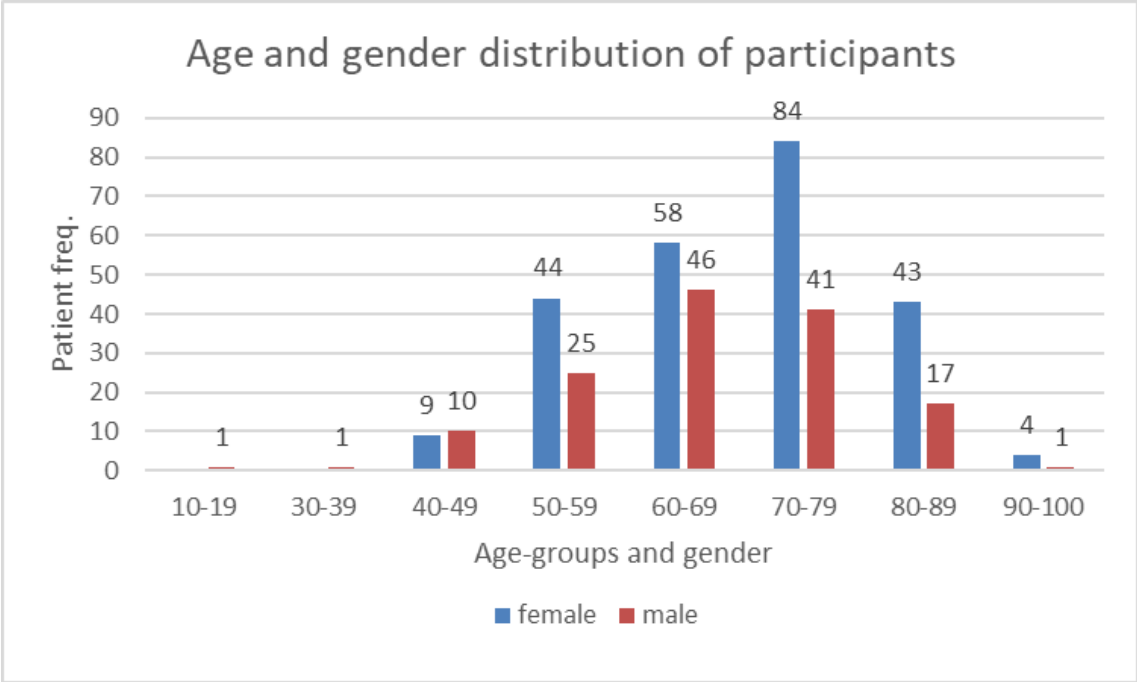


Figure 4 Participants by Age and Gender

Figure 4 depicts a graphical distribution participant age-groups and gender. From the graph besides the 2 aged below 40 years, 99.5% of study participants were aged 40 years and over.

4.2 Co-Morbidities of Cataract

Table 2 Co-Morbidities Identified Among Patient Sample

Co-morbidities	Freq	%
	N=384	100
<i>Hypertension</i>	82	21.4
<i>Glaucoma</i>	2	0.5
<i>Retinal Disease</i>	2	0.5
<i>Diabetes</i>	36	9.4
<i>None</i>	262	68.2

Table 2 is showing different co-morbidities observed in our study and the distribution among study participants. 21.4% of the participants had co-morbidities from hypertension, 9.6% from diabetes, 0.5% from glaucoma and 0.5% from other retinal diseases.

4.3 Proportion of Cataract Surgical Outcomes

Table 3 Showing Pre-Operative Visual Acuity among Patient Sample

Post-operative visual acuity	<i>Freq</i>	<i>%</i>
	<i>N=384</i>	<i>100</i>
<i>Good outcome (6/6 - 6/18)</i>	275	71.6
<i>Borderline outcome (6/24 - 6/60)</i>	103	26.8
<i>Poor outcome (5/60 - NPL)</i>	6	1.6

Table 3 Showing Pre-Operative Visual Acuity among Patient Sample, the proportion of cataract surgical outcome that falls within the WHO classification of good surgical outcome was 71.6% of the sample population. The proportion of poor surgical outcome was 1.6% and the remaining 26.8% falls within the WHO classification of borderline outcome.

4.4 Causes of Poor Outcomes

Table 4 Determinants of Poor Surgical Outcomes

Determinants of Poor Outcomes	Freq. (N=384)	Percent (%)
<i>Co-morbidities</i>	13	11.93
<i>Surgical complication</i>	1	0.92
<i>Inadequate refractive power</i>	42	38.53
<i>Post-surgery complication</i>	53	48.62
Total	109	100

4.4 Causes of Poor Outcomes

Table 4 is showing different factors affecting poor surgical outcome and their distribution by percentages. Among those with visual acuity less than 6/60 (poor outcome), 11.93% was caused by co-morbidities, 0.92% by surgical complications, 38.53% by inadequate refractive power and 48.62% by post-surgical complications.

Table 5 Causes of Poor Surgical Outcomes in the Region

Logistic regression		Number of Observations	N=384			
Log likelihood = -154.20992		LR chi2(4)	149.74			
		Prob > chi2	0.0000			
		Pseudo R2	0.3268			

<i>Post-operative visual outcome</i>	<i>Odds Ratio</i>	<i>Std. Err.</i>	<i>z</i>	<i>P>z</i>	<i>[95% Conf. Interval]</i>	
<i>Co-morbidities</i>	1.090041	0.062055	1.51	0.130	.9749555	1.218712
<i>Biometry</i>	.6177383	0.188568	-1.58	0.115	.3396021	1.12367
<i>Surgical complication during surgery</i>	1.387592	0.517045	0.88	0.379	.6684775	2.880293
<i>Post-surgical complications</i>	1.724518	0.135822	6.92	0.000	1.477842	2.01237
<i>_cons</i>	.2430966	0.063372	-5.43	0.000	.1458423	.4052046

Table 5 shows that for patients who had cataract surgery in the Eastern Region of Ghana, the odds of having poor post-operative visual outcome if patient has post-surgical complications is 1.72 times the odds of having poor post-operative visual outcome if they have no post-surgical complication. The prob>chi2 statistic was 0.000 < 0.05 which means this regression model is statistically significant in terms of its ability to predict post-operative visual outcome based on the independent variables like post-surgical complications, co-morbidities, biometry done and surgical complication. 1.

4.5 Demographic Features of Interview Respondents

Table 6 Demographic Features of Respondents (Qualitative)

District	Age in years	Sex
<i>Kwaebibrem</i>	54	<i>F</i>
<i>Kwaebibrem</i>	44	<i>F</i>
<i>New Juaben</i>	56	<i>M</i>
<i>New Juaben</i>	34	<i>F</i>
<i>Asuogyaman</i>	55	<i>M</i>
<i>Asuogyaman</i>	42	<i>F</i>
<i>Akuapem north</i>	59	<i>M</i>
<i>Akuapem north</i>	38	<i>F</i>
<i>Akuapem south</i>	42	<i>F</i>

Table 6 represents the demographic features of respondents. There were 3 males and 7 females with a mean age of 47.1 years.

4.6 Qualitative Results

Responses from participants were transcribed and summarized by finding common themes through triangulation.

4.6.1 Protocol For Cataract Surgery Is Summarized As Follows:

Patients were counseled and informed about the surgery procedure and possible outcomes from cataract surgery. Patients and relatives were given consent forms to sign voluntarily if agreed and pre-operative visual acuity is taken. Patients were then examined using slit-lamp biomicroscopy for anterior segment assessment and ophthalmoscopy for posterior segment assessment. Patients with mature cataract were tested with light projection in all quadrants to ascertain the health

status of the retina. Intra ocular pressure, blood pressure and fasting blood sugar were checked and biometry was performed to determine dioptric power of the intra ocular lens needed

Patients were then taken to a sterilized theatre with sterilized cataract set. Topical anesthesia was given to prepare the patient for surgery.

During surgery, Cataract lens was removed and replaced with intraocular lens. Depending on surgical technique, some were sutured and others have no sutures.

After surgical procedure, topical antibiotics and ant-inflammatory eye drops were given.

Eye shields were used to protect the operated eye which is usually removed the next morning.

Patients were then counseled again as a reminder on things they should not do for six weeks after surgery. Their visual acuities were checked the next morning which is usually termed as the first visit post-op. Patients were asked to return two weeks later for their second post-op review.

Patients were asked to return four weeks after second post-op for their third post-op visit.

At six weeks, visual acuity was expected to be stable and all wounds healed. Refractive correction was given to those with residual refractive error.

Table 7. Determinants of Poor Surgical Outcomes

Determinants of Poor outcomes	<i>No. of Key Informants who identified these factors as a cause of poor outcome)</i>	<i>% of responses per total no. of Key informants (10)</i>
<i>Co-morbidities</i>	8	80
<i>Post-surgical complication</i>	9	90
<i>Inadequate refractive power</i>	4	40
<i>Complications during surgery</i>	4	40
<i>Maturity of cataract</i>	1	10
<i>Use of traditional eye medicine</i>	1	10

Table 7 shows the various factors identified by key informants as the causes of poor outcome from cataract surgery, the number of respondents who identified these factors as a cause and the percentage distribution. 80% of respondents mentioned co-morbidity as a cause of poor outcome from cataract surgery, 90% mentioned post-surgical complication as a cause. 40% of respondents identified inadequate refractive power as a cause of poor outcome and another 40% mentioned complications during surgery as a cause of poor outcome. Only 10% mentioned maturity of cataract as a cause of poor outcome and another 10% mentioned the use of traditional eye medicine as a cause of poor outcome.

4.6.2 Improving Services

It was suggested that to improve services, biometry should be taken and done well. Health education and creating awareness on the importance of regular eye checks should be encouraged so pre-existing eye diseases are identified and dealt with at an early stage. Counseling should be properly done and relatives advised to encourage patients to conform to instructions given after surgery.

4.6.3 Access to Monitoring Tool

When asked if they had access to monitoring tool for cataract surgical outcomes, all respondents answered yes to having access to a monitoring tool but none used it regularly. Reasons given were that they are usually too busy to fill the forms during surgery and tend to forget after surgery. Some also said the WHO cataract monitoring tool (Limburg et al., 2005) had too many questions which had to be filled for every patient visit. It was suggested that if a simpler monitoring tool was designed, they will be more open to it.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Demographic Distribution and Its Effect on Surgical Outcomes

From the results, it was observed that females comprised the greatest percentage (63%) of patients who had undergone cataract surgeries and were more associated with poorer outcomes. Despite evidence showing that women are generally at higher risk of loss of vision from cataract than males, studies have also show that in many low-income settings the majority of patients who have undergone cataract surgery are men. A survey from Pakistan and India showed that females were associated with poor outcomes than males (Bourne et al., 2007; Murthy et al., 2001) however another study in Trinidad and Tobago found males to get poor outcomes from cataract surgery 1.37 times than females. Age has been known to be significantly associated with poorer visual outcomes (Norregaard et al., 1998) which was similar to results found in this study. Patients aged 80 years and over were found to be associated with poorer outcomes which is similar to results studies done by Desai 1999 (Desai et al., 1999).

Some reasons given for these inequalities are cultural beliefs, females relying on their male spouses financially and also permission before accessing health services (Ulldemolins et al., 2012). The findings from this study differ from the findings of studies in other low-income settings since the majority of patients in this study who had undergone cataract surgeries were females.

The mean age of patients who were selected as part of the study population was 68 years with a SD 10.9. The minimum age was 18 years and the maximum age was 100 years. Cataract is a disease of the eye, known to develop more often in the elderly and age is one of the major risk

factors for cataract. The majority of study participants (99.5%) were aged 40 years and above (Desai et al., 1999).

5.2 Cataract Surgical Outcomes by Proportion

Results from this study indicate that 71.4% of cataract surgeries performed in the Eastern region in 2017 had good surgical outcomes, 27.1% had borderline outcome and as low as 1.6% had poor surgical outcomes. This is contrary to results from several countries that reported higher proportion of poor surgical outcomes. Recent population-based studies in Sub-Saharan Africa reported 30% of cataract surgical outcomes as good, with the remaining 70%, impaired to poor outcomes (Lindfield et al., 2012). In other Sub-Saharan African countries, poor outcomes outnumbered good outcomes by 13% (Lewallen et al., 2015).

Also results from Malawi showed that 23.3% of cataract surgeries result in good outcomes while 53.3% result in poor outcomes (Courtright et al., 2004).

In Nigeria it was reported that 29% of cataract surgeries had good outcomes while 44.1% resulted in poor outcomes (Imam et al., 2011).

Other population-based studies from developing countries showed poor outcomes ranging from 12% in the Philippines to 64% in Cameroon (Imam et al., 2011). The low results of poor surgical outcome from this study may be due to several factors peculiar to the region. In Eastern region, all cataract surgeries are done by ophthalmologists and none by resident ophthalmologists. This can be attributed to the fact that there is no facility in the region that caters to the training of residents in ophthalmology. Another factor is the fact that almost all cataract surgeries done

within that period was the Small Incision Cataract Surgery technique which has been found to yield good results in visual outcomes compared to the ECCE and the ICCE (Tabin G. et al., 2008). Another reason could be the fact that 70.05% of participants had their biometry done which gave a more accurate reading of the patients refractive index required for good visual outcomes. All the 269 participants who took part in the study had their biometry done, 73.6% had good surgical outcome, 25.3% had borderline outcome and only 1.2% had poor outcomes.

5.3 Determinants and Causes of Poor Surgical Outcomes

Most factors that affect the development of cataract also affect its surgical outcomes considering it is the same people who will be coming for the surgeries. It was observed that majority of those coming for surgery were aged over 40 years and above which is consistent with most studies as cataract is evidenced to occur in older population (Desai et al., 1999). This is one of the reasons why most studies limit participant inclusion to those over 50 years although this study widened its participant inclusion range to include every possible cataract surgery patient within the catchment area.

Co-morbidities have been known to influence cataract surgical outcomes but results from our quantitative analysis did not show any significant association between co-morbidities and post-operative visual outcomes although responses from key informants, identified co-morbidities, post-surgical complications and inadequate refractive power as the major causes of poor outcomes from cataract surgery, which was consistent with other studies from India and Nepal where co-morbidities like diabetes, hypertension, ischemic heart disease, cornea oedema, cystoid macular oedema, retinal detachment, diabetic retinopathy, pre-existing glaucoma and age-related

macula degeneration were the major causes of poor visual outcomes in cataract surgery (Vivekenand et al., 2011) (Kandel et al., 2010).

From the responses to the qualitative survey, it was deduced that since most cataract patients report late when they see an eye care specialist for the first time, clinics are not privy or able to detect if they have other pre-existing ocular conditions that could also prevent them from seeing even if their cataract is removed, surgeries are done and it is only after cataract has been extracted are they able to detect such conditions especially those of the retina. Systemic co-morbidities do affect cataract surgery but those are easier to diagnose before surgery and appropriate measures are taken to restore the patient's sight.

In a study conducted in Spain by Gonzalez et al., (2014), it was found that poor visual outcomes were mostly attributed to surgical complications, both peri-operative and post-operative complications which was similar to the results from this study. Post-operative complications were found to be strongly associated with poor visual outcomes from cataract surgery, in particularly posterior capsular opacities (PCO). There was evidence of a strong significant association between post-surgical complications and post-operative visual outcome (measure of surgical outcome).

5.4 Limitations

This study would have been better served as a prospective study where patients would have been followed throughout the six week period in different facilities. Time allocated for this dissertation and work commitment makes it difficult to achieve this aim.

63 records had to be excluded due to so many missing data.

This was a hospital-based study and therefore cannot be extrapolated to the general population.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Factors affecting cataract surgical outcome are post-surgical complications, co-morbidities, inadequate optical correction, intra-surgical complications and application of traditional eye medicine.

The major cause of poor surgical outcome was post-surgical complications.

This study revealed that 71.6% of cataract surgeries done in eastern region may result in good outcomes, 26.8% may result as borderline outcomes and 1.6% may result in poor outcomes.

Although the study showed that nearly three-quarters of patients with cataract who received surgical intervention had good post-operative visual acuity, the 1.6% with severe visual impairment has serious public health implications. It is consequently important to put plans in place to reduce poor visual outcomes from complications arising after surgery

6.2 Recommendations

From this study it was observed that biometry plays an important role in surgical outcomes due to the fact that the test helps ascertain the correct amount of optical correction required for good vision. It is therefore important to encourage facilities without biometry machines to get acquire one or borrow from neighboring facilities.

Eye care workers, the ophthalmologists, the optometrists and the ophthalmic nurses should be encouraged to use the cataract surgical monitoring tool regularly, to enable them to audit themselves and improve on their skills.

Health education plays a huge role in the acceptance of ideas; there it is important to increase health education on the benefits of cataract surgery and encourage them with the fact that over 70% of cataract surgeries done in the eastern region end up with good visual acuity after surgery.

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APPENDICES

Appendix I Questionnaire

1.0 Demographic data

1.1. Date _____

1.2 Occupation _____ 1.3. ID no. _____ 1.4. Age (yrs.) _____

1.5. Sex: Male Female 1.6. District _____

1.7 Educational level primary secondary tertiary

2.0. Preoperative examination

2.1. Eye Operated: RE LE

2.2. VA: Presenting _____ 2.3. Biometry: YES NO

2.4 BCVA _____

2.5 IOL POWER _____

2.6. IOP _____

2.7. Co-morbidities:

Corneal Scar Hypertension Subluxated Lens Optic atrophy

AMD Glaucoma Retinal Diseases Diabetes Others _____

3.0 Surgery

3.1. Date _____

3.2. Surgeon: Ophthalmologist Ophthalmology resident

3.3. Surgical Technique:

3.4.1. Type: SICS ECCE PHACO ICCE

3.5. Intra-op Complications:

None iris prolapse Hyphema PC tear Vitreous loss

Zonular Dialysis Others_____

	Presenting VA	BCVA	IOP	COMPLICATIONS
Day 1				
1st week				
2 nd week				
4th week				
6th week				

Surgical complications (post-op)

Corneal edema Hyphema Vitreous loss Endophthalmitis Retinal detachment

PCO Decentered IOL Others_____

Appendix II Participant Information Sheet

Project title: Factors Affecting Cataract Surgical Outcomes in Eastern Region of Ghana

Institution: University of Ghana, School of Public Health, Legon, Accra

Ethics Committee: Ghana Health Service Ethics Review Committee

Email: ghserc@gmail.com

Principal

Investigator:.....

Tel No.:.....

Email:.....

Supervisor:

.....

You have been selected to take part in this study titled factors affecting cataract surgical outcomes in Eastern region of Ghana. Before you consent to participate, please read the information below which explains what the study is about. If you have any questions about the study, please ask. If you decide to take part in the study, please sign the consent sheet attached. If you decide not to take part or change your mind along the way, you can stop at any time. Participation in the study is voluntary.

Study rationale

This study seeks to contribute to an effective health-care delivery system on cataract surgical services offered in Eastern Region. Cataract is the leading cause of blindness in Eastern region and to achieve the WHO vision 2020 targets of 80% good cataract surgical outcomes, it is important to know the proportion of good surgical outcomes in the region, the causes of poor

surgical outcomes and determinants of both good and bad surgical outcomes, so services can be improved to achieve utmost results.

What the study involves

You will be asked questions regarding services for cataract surgeries in this facility. You will be asked question regarding your protocols for cataract surgery, factors that affect cataract surgical outcomes in your facility and how you think services can be improved with regards to cataract surgery. You will be asked personal questions such as age and sex and profession. The interview will be recorded digitally with a voice recorder, which will be transcribed and erased permanently after transcribing of data. Recorded and Transcribed data will be stored in a safety box with principal investigator having the only access, which will be shredded after analyses of data. The interview time is 30 minutes maximum. Your responses will be treated with utmost confidentiality and information given will not be used for any other purpose other than research with your permission. Individual names or facility names will not appear in the analysis of data. Participation is voluntary and you are free to withdraw from the study at any point if you choose not to continue.

Thank you for your time.

Appendix III Consent Form

Project title: Factors Affecting Cataract Surgical Outcomes in Eastern Region of Ghana

Institution: University of Ghana, School of Public Health, Legon-Accra

Ethics Committee: Ghana Health Service Ethics Review Committee

Email: ghserc@gmail.com

Principal

Investigator:.....

Tel No.:.....

Email:.....

Supervisor:

.....

This form is to certify that you have agreed to participate in this study. By signing this form, you agree to the following:

I have read the participant information sheet and understand what the study is about and what is required of me.

My participation in this study is voluntary and I understand that I can withdraw from participating at any point during the study. I agree to provide relevant information to the best of my knowledge and personal information given will be kept confidential.

.....

Participant name

.....

Participant profession

.....

Signature of participant

.....

Date

Appendix IV Qualitative Questionnaire

1. Please describe your protocol for cataract surgeries?
2. What are the common factors that affect cataract surgical outcomes in this facility?
3. What are the common causes of poor cataract surgical outcomes in this facility?
4. How do you think cataract surgical services can be improved in this facility?
5. Do you have any routine monitoring tool for cataract surgeries?
6. If you do, how often do you use it?

ETHICAL APPROVAL

CORRECTION OF ERRORS INDICATED IN EXAMINERS REPORTS

Name of Candidate: Agatha Mensah-Debrah

Candidate ID: 10599371

Title of Thesis: Factors affecting cataract surgical outcome in the
Eastern Region of Ghana

Type of Degree: Masters in Public Health

EXAMINER ONE	
COMMENTS	RESPONSE
Major findings from the research:	
<p>Relevance and importance of the findings</p> <p><i>This candidate reveals from the study that major determinants of good surgical outcomes for cataract surgeries include the following; post-surgical complications. In this study population, 71.6% of participants had good surgical outcome with very minimal poor outcomes for the surgery. The candidate did not have an objective assessment of good, poor and moderate based on theoretical framework and on a Likert scale built to assess this on sound theoretical foundation. It is also interesting that whereas the qualitative arm only found one predictor of cataract outcomes, it is rather the qualitative arm that rather found the use of traditional eye medicine as major factors that predicted outcomes.</i></p>	<p>The grading of cataract surgical outcome; good outcome (visual acuity better than 6/18), borderline outcome (visual acuity of 6/18 – 6/60) and poor outcome (visual acuity worse than 6/60) was based on the WHO recommended tool for monitoring cataract surgical outcome and has been used in several published studies as indicated in the thesis (page 4)</p>
General comments	
<p>Format, standard of presentation, sectioning, typing, etc. of the thesis/dissertation itself</p> <p><i>This section shows minor typos highlighted</i></p>	<p>All typos highlighted in text were corrected</p>

<i>in text for correction</i>	
EXAMINER TWO	
<p>General information: Objectives of the study</p> <p><i>The research questions together with the general objectives were all clearly stated, although there were few grammatical issues which have been indicated in the thesis</i></p>	Grammatical issues have been corrected in the thesis (Page 10)
<p>Literature review and theoretical foundation</p>	
<p>I. Appropriateness of theoretical conceptual framework</p> <p><i>Although the illustration of the conceptual framework was appropriate, its narrative was inadequate. For instance, the candidate needs to explain how co-morbidities and complications affect cataract surgical outcomes</i></p>	Narrative of the conceptual framework has been adequately updated to explain how co-morbidities and complications affect cataract surgical outcome (page 8-9)
<p>II. Candidate's knowledge of pertinent literature and quality of review</p> <p><i>The candidate's review of the literature is</i></p>	Literature on factors affecting cataract surgical outcome has been updated to include literature on co-morbidities and complications in the thesis (page 11-17)

<p><i>inadequate. The literature on the factors captured in the conceptual framework must be reviewed. For instance literature on the demographic factors and complications associated with surgical outcome must be reviewed and presented.</i></p>	
<p>Design and relevance of methodology used</p>	
<p>I. Appropriateness of the study design</p> <p><i>The candidate used a cross-sectional design consisting of quantitative and qualitative approaches. She however needs to provide more clarity on the qualitative part</i></p>	<p>More clarity on qualitative data collection method has been provided in the thesis (page 18)</p>
<p>II. Appropriateness of data gathering method(s).</p> <p><i>Although the data gathering methods employed by the candidate are appropriate, she needs to provide additional clarity in the thesis</i></p>	<p>More clarity on the data collection methods has been provided in the thesis (pages 20 to 24)</p>
<p>III. Appropriateness of data analysis</p> <p><i>The candidate must provide better explanation for her analytic plan. For instance, how were the themes for the</i></p>	<p>Analytic plan has been explained further in the thesis (page 25)</p>

<p><i>qualitative part identified? Her descriptive and regression analytic plan were missing. Additionally, she did not indicate the significance level for her analysis.</i></p>	
<p>Major findings from the research</p> <p>Assess the main results obtained from the analysis of the data</p>	
<p>Quality of discussion</p> <p><i>The candidate must discuss her results in relation with other published findings, in order to improve on the quality of her discussion</i></p>	<p>The section on discussion of results has been updated. The results have been discussed within the context of other published studies on the subject. (page 35 - 38)</p>
<p>Clarity and Justification of candidate's conclusions and recommendations</p>	
<p>I. Whether conclusions address objectives of study</p> <p><i>The candidate needs to rewrite the conclusion for the study. She failed to state the factor(s) associated with cataract surgical outcome in the study area</i></p>	<p>The entire chapter on conclusion and recommendations was rewritten to reflect the result and discussion sections of the study</p>
<p>II. Whether recommendations emanate from the findings</p> <p><i>Some of her recommendations did not emanate from her findings. This must be addressed</i></p>	<p>Recommendations were rewritten to reflect conclusions drawn from the study findings only.</p>

<p>III. Feasibility of recommendations</p> <p><i>With the above, not all the recommendations will be feasible</i></p>	<p>The section on recommendation has been rewritten and efforts made to ensure the recommendations are not only feasible but are based on the results and discussions.</p>
<p>General comments</p>	
<p>Citations and references</p> <p><i>The candidate did not follow the recommended APA style of listing references</i></p>	<p>The referencing style has been updated to conform with the recommended APA style of listing references</p>

Signature

Date

Agatha Mensah-Debrah

(Student)

Signature.....

Date

Dr Anthony Danso-Appiah

(Supervisor)