Chu JPO, et al., J Ophthalmic Clin Res 2024, 11: 0116
DOI: 10.24966/OCR-8887/100116

HSOA Journal of Ophthalmology & Clinical Research

Research Article

Visual Outcome of Cataract Surgeries Performed In a Rural Eye Care Facility in the Philippines: A One-Year Retrospective Study

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Abstract

Objective: This study aimed to determine the demography, incidence of surgical complications, and visual outcome of patients who had cataract surgery at a rural eye care facility in Tarlac, Philippines.

Methods: This is a 1-year retrospective case study of the visual outcomes of patients who underwent cataract surgery in a rural eye care facility in Paniqui, Tarlac, Philippines. Comparative statistics such as t- test for means and Z-test for proportions were used to determine differences between bi-variate groups (ie. gender or age).

Results: During the 1-year period, there were 294 patients (340 eyes) who underwent cataract surgery. Fifty-nine (20.07%) patients were less than 60 years of age, whereas 235 (79.93%) patients were already aged 60 and above. There were 142 (48.30%) male and 152 (51.70%) female patients. Preoperative visual acuity appears to be skewed towards poor vision (<20/200). Two hundred sixteen (63.53%) eyes had visual acuity less than 20/200, while the number of eyes with fair (<20/60 - 20/200) and good (20/20 - 20/60) vision were 95 (27.9%) and 29 (8.53%), respectively. Preoperative and postoperative visual acuities categorized as good, fair and poor based on the definition stated by the WHO. There are significant differences (p value <.0001) between the preoperative and postoperative visual acuities in all categories Specifically, the number of eyes with good visual acuity increased from 29 (8.53%) preoperatively to 320 (94.12%) postoperatively, whereas the frequency of fair and poor visual acuities decreased from 95 (27.94%) and 216 (63.53%) preoperatively to 8 (2.35%) and 12 (3.53%) postoperatively, respectively.

Conclusion: The rural eye care facility achieved the WHO recommendation for adequate visual outcomes of greater than 80% of good visual outcome. Contrary to other studies, old age does not necessarily equate to poor surgical outcomes in this study. However, pre-existing ocular illnesses and surgical complications clearly do contribute to poor outcomes. In cases of pre-existing ocular comorbidities, it is still possible to gain a good outcome if the ocular condition is still on the early stages. Similarly, in surgical complications such as posterior capsular rupture, good outcomes are also achievable if the surgeon is skilled enough to handle such situations.

Keywords: Cataract surgeries; Eye care; Retrospective study; Visual outcome

Introduction

Cataract is the primary cause of preventable blindness globally. Some studies have stated that 75% of this visually impairing illness represents cases from developing counties [1]. In the Philippines, the Third National Survey on Blindness determined that the prevalence of visual impairment is 4.62%, with cataract accounting for the most common cause of bilateral blindness (<CF3m) and second most common cause of low vision (<6/18, ≥ CF 3m) at 62.1% and 40.8% respectively [2].

In 1998, the WHO stated that the prevalence of blindness is higher in rural areas compared to urbanized regions and that there is a need to make eye care accessible to underserved areas [3,4]. The Philippines, a developing Southeast Asian nation, is still presented with geographic and socioeconomic challenges that make eye care less accessible particularly in rural areas [5].

Cataract surgery remains to be the only effective treatment for visually significant cataracts [3]. It not only serves to restore visual function, but also improve the quality of life.[7] Visual outcomes of cataract surgery can be categorized into three according to the WHO with good being 20/20 to 20/60, fair <20/60 to 20/200, and poor <20/200. The WHO also defined adequate visual outcome as good uncorrected postoperative visual acuity of greater than 80%, and corrected postoperative visual acuity of greater than 90%. Borderline and poor outcomes should be less than 15% and 5% respectively [6].

Previous studies consider preoperative ocular comorbidities, perioperative and postoperative complications, and refractive error as factors for poor visual outcomes [7,8]. The quality of surgery and the surgeon's skills similarly affect surgical outcomes [9,10].

Currently, there are only two studies regarding visual outcomes of cataract surgery in the Philippines. One study is a hospital-based study that looks into the visual outcomes of phacoemulsification surgeries performed by third-year residents in a training institution, while the other is a multicenter study of 3 countries that included two rural

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Citation: Chu JPO, Lagao MJO (2024) Visual Outcome of Cataract Surgeries Performed In a Rural Eye Care Facility in the Philippines: A One-Year Retrospective Study. J Ophthalmic Clin Res 11: 116.

Received: February 18, 2024; **Accepted:** February 27, 2024; **Published:** March 05, 2024

provinces in the central islands of the Philippines, the Negros Island and Antique.

There is no available data in a rural setting north of Manila, the county's capital. Hence, a retrospective non-probability sampling method will be made to determine the demographic, clinical profile and visual outcomes of cataract surgeries performed in a rural eye care facility in Tarlac, Philippines. This will provide information that can be used to motivate cataract surgeons to monitor surgical outcomes in order to detect and make possible improvements towards the achievement of better visual outcomes [11].

Significance of the Study

Cataract is the leading cause of reversible blindness worldwide, and loss of vision from cataract represents more than half of global burden disease [12]. The center where surgeries were performed has been only functional for over a year, and is the first standalone eye care facility with an ambulatory surgical unit in the province. The results of this study could identify the factors associated with poor surgical outcomes, and also motivate other cataract surgeons to monitor their own results in order to determine improvement, and if it meets adequate outcomes as defined by the WHO. Based on research, there has been no study done regarding outcomes of cataract surgeries in a rural setting in the northern parts of the Philippines.

Literature Review

A cataract is an eye condition that involves the opacification of the crystalline lens [2,6]. These results to a decline in visual function leading to visual impairment and blindness. Although there are various conditions that can cause cataract formation, aging is still the most common cause [3]. It has the highest prevalence of visual impairment in people above 40 years of age [13].

Cataracts are the leading cause of reversible blindness worldwide [10,11]. It accounts for more than 50% of global burden of disease [14]. However, there is a disproportionate burden to as much as 75% in developing nations [10,13,14].

The treatment of this visually debilitating disease is cataract extraction with intraocular lens implant [15]. It is the most common procedure worldwide [4], and is also considered to be the most successful procedure in the field of medicine [3]. It is a simple and cost-effective procedure that aims to restore visual function and independence, which results to improved quality of life [9,15,16]. For adequate visual outcomes, the World Health Organization has recommended that postoperative good uncorrected visual acuity (20/20- 20/60) of patients be more than 80%, and poor (<20/200) and borderline or fair (<20/60-20/200) be less than 20% [17].

Although cataract extraction is cost-effective and has a high success rate, the quality of surgery and pre-existing ocular conditions may result to poor visual outcome [4,11]. Causes of poor visual outcomes can be classified as pre-existing ocular comorbidities, intraoperative and postoperative complications, and refractive errors [9,17]. These results were paralleled by a study in Liberia, which reported that poor visual outcomes were associated with older age, surgical complications, presence of ocular comorbidity, and had an ACIOL inserted or left aphakic [6].

The use of standard intraocular lens (IOL) powers instead of using a biometry to accurately calculate the IOL power is also associated with a poorer visual outcome.[16] However, a multicenter study described that there was no difference between the outcomes of patients who received biometry and to those who did not among the Filipino population in the study [9].

Ukponmwan and her colleagues stated that the most common early postoperative complication, intraoperative complication, and later postoperative complications were striate keratopathy, posterior capsular rupture, and cystoid macular edema respectively [17]. However, other studies reported that uncorrected refractive error was the most common cause of poor outcomes [9,10].

Several studies have showed that ocular comorbidities such as glaucoma, age related macular degeneration, and diabetic retinopathy are associated with poor outcomes [9,16]. However, the visual acuity could still be good in cases where pre-existing ocular conditions are still mild or on early stages [7].

Despite the advances in cataract surgery, developing countries still face barriers and challenges in the availability of eye care services and resources affecting visual outcomes of cataract surgeries [6]. Population based studies have shown that there are significant disparities in cataract surgical outcomes between high-income countries and low-middle income countries [4]. However, rural communities in developed countries are also presented with similar issues [8].

Olawoye and his colleagues reported that outcomes of a university hospital in Ibadan, Nigeria did not meet the WHO recommended guideline [13]. Similar results were described in one study involving 3 low- income countries such as Bangladesh. Kenya and the Philippines [9]. However, two separate studies in India and Pakistan reported that they have >80% good visual outcomes, which had met the WHO standard for adequate outcomes [10,15].

Cataract surgical outcomes are not widely reported in the Philippines. Based on research, there are only two studies that have described local data. It should be emphasized that monitoring visual outcomes after cataract surgery will allow cataract surgeons to identify causes of poor outcome and areas needing of improvement. Moreover, a reduction in the incidence of complications is associated with routine monitoring of cataract surgical outcomes [18].

Objectvies

General objective

This study aims to determine the visual outcome of patients who underwent cataract surgery from January 2022 to December 2022 at a rural eye care facility in Tarlac, Philippines.

Specific objectives

This study specifically intends

- To describe the patients who underwent cataract surgery in terms of age, sex, laterality of eye involved, type of cataract surgery performed, type of intraocular lens (IOL) inserted.
- To determine the ocular comorbidities potentially contributing to poor visual outcomes
- To determine the pre-operative visual acuity and the post-operative at one month.
- To determine the incidence of peri-operative and post-operative complications.

- To determine if the overall visual outcome has met the WHO criteria

End Users/Target Beneficiaries

The ophthalmologists in the rural eye care facility will be able to monitor the visual outcomes of the cataract surgeries they have performed for a duration of 1 year since the ambulatory surgical unit of the center has opened. Since the results of this study will also show if the visual outcomes had met the WHO standard, the data gathered can be used as a benchmark on the performance and outcomes of cataract surgeries in the institution, and as a tool to identify and evaluate areas needing of improvement. Local ophthalmologists may also use this as a guide to evaluate their own results. Overall, this study will enhance the ocular health delivery particularly cataract surgery.

Program/Project Duration

The writing of research protocol and review of related literature will start on January 2023. Data collection followed when the study has been approved by the Institutional Review Board (IRB) on April 2023. The research was completed and submitted on July 2023.

Methodology

Study design

This study used a retrospective case series study design using the medical records of patients who underwent cataract surgery in Chu Eye Care Center, a standalone eye care facility located in Paniqui, Tarlac, Philippines from January 2022 to December 2022. Data from the medical records were rec orded, tabulated, and analyzed upon approval from the IRB.

Study population and sampling

This study included patients who underwent cataract surgery in a rural eye care facility in Paniqui, Tarlac, Philippines from January 2022 to December 2022. Age and sex distribution, pre-existing ocular co- morbidities, pre-operative and post-operative visual acuities, peri-operative and post-operative complications were described. This study used a non-probability sampling method. All patients who met inclusion and exclusion the criteria for the specified period of time were included in this study.

Inclusion Criteria

- Patients should be registered in the institution
- Patients should be diagnosed with cataract needing surgical intervention
- Patients should have undergone cataract surgery of one or both eyes in the eye care facility
- Patients should have had the procedure done within the period of January 2022 to December 2022

Exclusion Criteria

- Patients who had combined trabeculectomy and cataract extraction with IOL
- Patients with incomplete records

Site of Study

The study was done at Chu Eye Care Center, a private standalone eye care facility equipped with its own ambulatory surgical unit in Paniqui, Tarlac, Philippines.

Study Plan

The investigators collected data of patients who underwent cataract surgery at the rural eye care facility. Data was accessed and gathered at the Medical Records Section using physical and electronic charts. The paper documents were secured in an envelope or folder that was brought in to a private office for filing, and these were secured in a cabinet with locks. The electronic files were saved in an external hard drive memory protected with password and was secured in a cabinet with locks. A dedicated password protected computer was used for data processing and analysis, which were only accessible to investigators.

The study did not involve administration of any experimental or routine tests, treatment or any diagnostic or therapeutic procedures.

Plans for Data Processing and Analysis

Approval for chart retrieval was obtained from the Medical Records Section and Data Privacy Officer. To ensure anonymity of patients throughout the duration of this study, a combination of alphanumeric characters was used and assigned to each patient, and used this format: the first letter of the patient's last name and the date of surgery followed by the order of chart reviewed.

Example: Juan Dela Cruz January 1, 2022; first chart to be review by the PI.

Example Code: D01012022-001

The code generated was also used for verification purposes. The identity of all patients were not disclosed in the process of data interpretation. Data collection only included age and sex, pre-existing ocular co-morbidities, pre-operative and post-operative visual acuities, peri-operative and post-operative complications. Shown below are the data collection form and dummy tables used in this study.

Descriptive and comparative statistics were computed from the data gathered to create a detailed profile of patients. Specifically, descriptive statistics included frequency and percentages for categorical data, and mean scores for continuous data. Comparative statistics such as t-test for means and Z-test for proportions were used to understand patterns or differences between bi-variate groups (i.e. gender or age).

All data were recorded and processed electronically using word processing and spreadsheet applications and were saved in a secured hard drive as described above. The collected raw data was only accessible to the investigators.

The data were saved and secured for reference and verification purposes once the processing was completed. The processed data and results of the study were only accessible to other researchers upon securing approval from the primary investigators. The information used for this study will be destroyed by reformatting the external hard drive after 5 years for data protection.

Ethical/Biosafety Clearance

The research protocol was submitted to the Dr. Paulino J. Garcia Memorial Research and Medical Center - Institutional Review Board for ethical clearance. There was no expected risk on patients since the study design did not involve participant interaction and testing. No intervention such as treatment, procedure or exposure were done on participants as mentioned in the study plan. There were no expected benefit or renumeration for the participants. The researchers/investigators received no renumeration for the performance of this research from any third party aside from potential financial support from the implementing agency. Since the performance of research gathered a pool of data from the patient charts, permission from the Health Information and Records Management Section as well as Data Privacy officer were secured. This was in compliance with the Data Privacy act of 2012 and its Implementing Rules and Regulations protecting patient privacy.

Technical Clearance And Ethical Clearance
Research Initiation Identification of patient charts that will fulfill the inclusion and exclusion criteria
Data collection with utilization of the hospital information system
Data analysis and interpretation
Reporting of findings and results for review and publication

Results

During the 1-year period, there were 296 patients or 344 eyes that underwent cataract surgery. However, 4 eyes did not complete the follow up eye examination at 1-month post-cataract surgery, consequently excluding those eyes in this study.

Fifty-nine (20.07%) patients were less than 60 years of age, whereas 235 (79.93%) patients were already considered senior citizens (ages 60 and above). There were 142 (48.30%) male and 152 (51.70%) female patients. Two hundred ninety-six (87.06%) patients received unilateral cataract surgery, while 44 (12.94%) patients had cataract surgery on both eyes (see Table 1).

Variables	Frequency	Percentage
Age		
<60	59	20.07
>60	235	79.93
Sex		
Male	142	48.30
Female	152	51.70
Laterality		
Right	192	56.47
Left	148	43.53
Preoperative Visual Acuity		
20/20 - 20/60 (Good)	29	8.53
<20/60-20/200(Fair)	95	27.94
<20/200 (Poor)	216	63.53
Systemic Comorbidities		
	138	46.94
Hypertension	69	23.47
Diabetes Mellitus	11	3.74
Dyslipidemia	6	2.04
Ischemic Heart Disease	7	2.38
Cardiac Dysrhythmia	6	2.04
Asthma	4	1.36
Pulmonary Tuberculosis	5	1.70
Cerebrovascular Infarct	1	0.34
Systemic Lupus	7	2.38
Chronic Kidney Disease	118	40.14
None		
Ocular Comorbidities		0.34
	1	1.70
Central Vein Occlusion	5	0.68
Glaucoma	2	0.34
Macular Degeneration	1	0.68
Macular Scar	2	96.60
Subluxated Lens	284	
None		
Type of surgery		
Phacoemulsification with in the-bag IOL Implantation	318	93.53
Phacoemulsification with Anterior Vitrectomy and Sulcus IOL Implantation	12	3.53
Phacoemulsification with Anterior Vitrectomy and ACIOL Implantation	8	2.35
ECCE with Anterior Vitrectomy and ACIOL Implantation	1	0.29
ICCE with Anterior Vitrectomy and ACIOL Implantation	1	2.09

Table 1: Demographic and Clinical Characteristics of Patients.

Preoperative visual acuity appears to be skewed towards poor vision, which is defined by the World Health Organization (WHO) as visual acuity of <20/200 [18]. Two hundred sixteen (63.53%) eyes had visual acuity less than 20/200, while the number of eyes with fair (<20/60 - 20/200) and good (20/20 - 20/60) vision were 95 (27.9%) and 29 (8.53%), respectively.

As shown in (table 1), the most common systemic illness of the patients in this study was hypertension, which was present in 138 (46.94%) individuals, followed by diabetes mellitus at 69 (23.47%). and dyslipidemia at 11 (3.74%). Other systemic illnesses noted from the patients were ischemic heart disease, cardiac dysrhythmia, asthma, previous and on-going treatment for pulmonary tuberculosis, cerebrovascular infarct, systemic lupus, and chronic kidney disease. On the other hand, 118 (40.14%) of the patients did not have any systemic comorbidity.

Moreover, 284 (96.60%) patients did not have pre-existing ocular illness apart from the presence of cataracts. One (0.34%) patient had a previous history of central retinal vein occlusion, 5 (1.70%) had pre-existing glaucoma, 2 (0.68%) had macular degeneration, 1 (0.34%) had a macular scar, and 2 (0.68%) presented with subluxated lenses.

Phacoemulsification with intraocular lens (IOL) implantation was the surgical procedure performed in 338 (99.41%) eyes. However, 20 (5.88%) of those eyes had an intraoperative complication of posterior capsular rupture (see Table 2) wherein anterior vitrectomy was performed; twelve (3.53%) had their intraocular lenses placed at the sulcus, while 8 (2.35%) eyes had an anterior chamber intraocular lens

(ACIOL) implanted. An extracapsular cataract extraction (ECCE) with anterior vitrectomy was performed in one of the patients that presented with a subluxated lens, while an intracapsular cataract extraction (ICCE) with anterior vitrectomy was performed on the other patient with subluxated lens.

(Table 2) shows the frequency of preoperative and postoperative visual acuities categorized as good, fair and poor based on the definition stated by the WHO [18]. There are significant differences (p value <.0001) between the preoperative and postoperative visual acuities in all categories Specifically, the number of eyes with good visual acuity increased from 29 (8.53%) preoperatively to 320 (94.12%) postoperatively, whereas the frequency of fair and poor visual acuities decreased from 95 (27.94%) and 216 (63.53%) preoperatively to 8 (2.35%) and 12 (3.53%) postoperatively, respectively.

Visual Acuity	Preoperative n (%)	Postoperative n (%)	P value
20/20 - 20/60 (Good)	29 (8.53)	320 (94.12)	<0.0001
<20/60 - 20/200 (Fair)	95 (27.94)	8 (2.35)	<0.0001
<20/200 (Poor)	216 (63.53)	12 (3.53)	<0.0001

Table 2: Frequency of preoperative and postoperative visual acuity based on WHO guideline.

Outcomes between the two age groups, as seen in (Table 3), exhibited a substantial increase in good postoperative visual acuities, and decrease in fair and poor visual outcomes, which are statistically significant (p value <.0001) in all visual outcome categories. Postoperative proportions between age <60 and >60 is statistically equal across all visual acuity categories. This would mean that rates of visual outcomes when both groups are compared are not significantly different. This implies that age group is not a factor of postoperative visual outcomes.

	20/20 - 20/60 (Good) n (%)	<20/60 - 20/200 (Fair) n (%)	<20/60 - 20/200 (Fair) n (%)
<60 Preoperative Postoperative P Value	7(10) 64(91.43) <0.0001	16 (22.86) 2 (2.86) <0.0001	47 (67.14) 4 (5.71) <0.0001
>60 Preoperative Postoperative P Value	22 (8.15) 254 (94.07) <0.0001	75 (27.78) 8 (2.96) <0.0001	173 (64.07) 8 (2.96) <0.0001
<60 vs. >60 Preoperative [<60] Postoperative[>60] P Value	64 (91.43) 254 (94.07) 0.4237	2 (2.86) 8 (2.96) 0.9648	4 (5.71) 8 (2.96) 0.2663

Table 3: Frequency of Preoperative and Postoperative Visual Acuity of Patients by Age Group.

The preoperative visual acuities and postoperative outcomes based on gender also exhibited the same trend, and are also statistically different (see Table 4). Similar to age groups, sex classification does not appear to be a factor of postoperative visual outcomes. This is due to the lack of statistical difference between male and female postoperative visual acuity scores. Although, there is slightly more females having fair visual acuity over males (p-value 0.0765), there is not enough evidence to conclude that females have better postoperative visual outcomes.

	20/20-20/60 (Good) n (%)	20/60-20/200 (Fair) n (%)	<20/200 (Poor) n (%)
Male Preoperative Postoperative P Value	14 (8.75) 153 (94.44) <0.0001	38 (23.46) 2 (1.24) <0.0001	110 (67.90) 7 (4.32) <0.0001
Female Preoperative Postoperative P Value	16 (8.99) 165 (92.70) <0.0001	51 (28.65) 8 (4.49) <0.0001	111 (62.36) 5 (2.81) <0.0001
Male vs. Female Postoperative [Male] Postoperative [Female] P value	 153 (94.44) 165 (92.70) 0.5148	 2 (1.24) 8 (4.49) 0.0765	 7 (4.32) 5 (2.81) 0.4511

Table 4: Frequency of Preoperative and Postoperative Visual Acuity of Patients by Sex.

Postoperative visual acuity among those that received phacoemulsification with in-the-bag IOL implantation was significantly different from the preoperative visual acuity (p value <.0001). There was a large improvement in good postoperative visual acuity and decrease in the number of poor postoperative visual acuity compared with the preoperative data. Similar patterns were also observed for the eyes that underwent phacoemulsification with anterior vitrectomy with the IOL implanted either in the sulcus or in the anterior chamber. The eyes which received an ECCE with anterior vitrectomy or an ICCE with anterior vitrectomy for subluxated lenses had good postoperative visual outcomes; both eyes had an anterior chamber intraocular lens (ACIOL) implanted due to loss of capsular support (see Table 5).

Type of Cataract Surgery	Visual Outcome	Preoperative n (%)	Postoperative n (%)	P value
Phacoemulsification with in-the-bag IOL Implantation (Total = 318)	20/20-20/60 (Good) <20/60-20/200 (Fair) <20/200 (Poor)	27 (8.49) 92 (28.93) 199 (62.58)	304 (95.60) 6 (1.89) 8 (2.52)	<0.0001 <0.0001 <0.0001
Phacoemulsification with Anterior Vitrectomy and Sulcus IOL Implantation (Total = 12) Phacoemulsification	20/20-20/60 (Good) <20/60-20/200 (Fair) <20/200 (Poor)	0 3 (25.00) 9 (75.00)	9 (75.00) 0 3 (25.00)	<0.0001 <0.0001 <0.0001
Phacoemulsification with Anterior Vitrectomy and ACIOL Implantation (Total = 8)	20/20-20/60 (Good) <20/60-20/200 (Fair) <20/200 (Poor)	2 (25.00) 0 6 (75.00)	5 (62.50) 2 (25.00) 1 (12.50)	<0.0001 <0.0001 <0.0001
ECCE with Anterior Vitrectomy and ACIOL Implantation (Total = 1) ICCE with Anterior Vitrectomy and ACIOL Implantation (Total = 1)	20/20-20/60 (Good) <20/60-20/200 (Fair) <20/200 (Poor) 20/20-20/60 (Good) <20/60-20/200 (Fair) <20/200 (Poor)	0 0 1 (100.00) 0 0 1 (100.00)	1 100.00) 0 0 1 (100.00) 0 0	N/A N/A N/A N/A N/A N/A

Table 5: Visual Outcomes of based on the type of surgery performed and type of IOL inserted.

A total of 11 eyes were noted to have pre-existing ocular comorbidities with glaucoma being the most common as it was present in 5 eyes. Central retinal occlusion was present in 1 eye, macular degeneration in 2 eyes, and macular scar in 1 eye. These ocular comorbidities were shown to have contributed to the fair and poor postoperative visual acuities. However, the 2 eyes with subluxated lens still had good visual outcomes despite having anterior vitrectomy performed and an ACIOL implanted in both eyes (see Table 6).

Pre-existing ocular Comorbidities	Frequency	Percentage	Final Visual Acuity Good	Fair	Poor
Central Vein Occlusion	1	0.29	-	-	1
Glaucoma	5	1.47	2	1	2
Macular Degeneration	2	0.59	-	2	-
Macular Scar	1	0.29	-	-	1
Subluxated Lens	2	0.59	2	-	-
None	329	96.75	318	5	7

Table 6: Visual outcomes of patients with pre-existing comorbidities compared to those without.

The most common postoperative complication was striate keratopathy, which occurred in 66 (19.41%) eyes, and were treated with sodium chloride 5% ophthalmic solution until the corneal edema and Descemet's fold had resolved. This was followed by transient elevation of intraocular pressure (IOP) in 10 (2.94%) eyes, which were briefly treated with anti-glaucoma medications just until the eyes sustained IOPs that were within normal limits. Moreover, other postoperative complications noted were retained cortical lens material in 2 (0.59%) eyes and postoperative uveitis in 3 (0.88%) eyes, which completely resolved with topical ocular steroid. A shallow anterior chamber due to a wound leak was also observed in 1 (0.29%) eye postoperatively. There was no postoperative complication seen in 258 (75.88%) eyes (see Table 6).

Discussion

A cataract is an eye condition that involves the opacification of the crystalline lens [3,7]. This results to a decline in visual function leading to visual impairment and blindness. They are the leading cause of reversible blindness worldwide [10,11]. It also accounts for more than 50% of global burden of disease.16 However, there is a disproportionate burden to as much as 75% in developing nations [10,13,14].

Despite the advances in cataract surgery, developing countries still face barriers and challenges in the availability of eye care services and resources affecting visual outcomes of cataract surgeries [6]. Population based studies have shown that there are significant disparities in cataract surgical outcomes between high-income countries and low-middle income countries [4]. However, rural communities in developed countries are also presented with similar issues [8].

There are various conditions that causes cataract formation, but aging is still the most common cause [3]. It has the highest prevalence of visual impairment in people above 40 years of age [16]. This statement reflects the age demographic profile of the patients in this study as there were 235 (79.93%) patients who were aged 60 and above at the time of surgery. According to Khanna et al, older age is associated with poor visual outcomes [6]. However, 254 (94.07%) eyes in this age group had good visual outcomes, while only 8 (2.96%) had fair, and 8 (2.96%) had poor visual outcomes.

The treatment of this visually debilitating disease is cataract extraction with intraocular lens implant [17]. It is the most common procedure worldwide[4] and is also considered to be the most successful procedure in the field of medicine [3]. It is a simple and cost-effective procedure that aims to restore visual function and independence, which results to improved quality of life [9,15,16]. Two hundred ninety-four patients had cataract surgery in this study. The female to male ratio of patients in this study is 1:1.07. Both groups had a significant increase in the number of eyes with good vision. The postoperative visual acuity of female and male patients showed good postoperative visual outcomes at 92.70% and 94.44%, respectively. (see Table 7). Furthermore, more cataract surgeries were done in the right eye than the left, but 44 patients had bilateral cataract surgeries.

Intraoperative Complications	Frequency	Percentage	Final Visual Acuity Good	Fair	Poor
Posterior Capsular Rent	20	5.88	14	2	4
14 2 4					
None	320	94.12	304	6	8

Table 7: Visual outcomes of patients with intraoperative complications compared to those without.

The WHO has recommended that postoperative good uncorrected visual acuity (20/20-20/60) of patients be more than 80%, and poor (<20/200) and fair (<20/60-20/200) be less than 20% to achieve an overall adequate visual outcomes [18]. As shown in (Table 8), 320 (94.12%) eyes had good uncorrected visual acuities whereas only 2.35% had fair, and 3.53% had poor visual outcomes. This would mean that, during the 1 year period, the eye care facility involved in this study has met the standard the WHO had set. Similarly, two separate studies in India and Pakistan had met the WHO standard for adequate outcomes as they have also reported that they have >80% good visual outcomes [10,15]. Conversely, Olawoye and his colleagues reported that outcomes of a university hospital in Ibadan, Nigeria did not meet the WHO recommended guideline [13]. Similar results were described in one study involving 3 low-income countries such as Bangladesh. Kenya and the Philippines [9]. Earlier studies in Nigeria have shown that they also were not able to meet the said criteria. Ukponmwan et al evaluated the outcomes of cataract surgeries in Benin, Nigeria and reported good visual outcome of 59.7% [16]. Other studies in Nigeria also showed similar trends as Nwosu reported 58.95%, and Bekibele reported only 55.7% had good visual outcomes [1,12].

Postoperative Complications	Frequency	Percentage	Final Visual Acuity Good	Fair	Poor
Striate Keratopathy	66	19.41	64	1	1
Elevated IOP	10	2.94	8	–	2
Shallow Anterior Chamber	1	0.29	1	-	-
Retained Cortical Material	2	0.59	1	1	-3
Post-operative Uveitis	3	0.88	243	6	9
None	258	75.88			

Table 8: Visual outcomes of patients with postoperative complications compared to those without.

The patients included in this study all got a biometry to accurately calculate the IOL power since the use of standard intraocular lens (IOL) powers without biometry is associated with a poorer visual outcome (Ukponmwan et al, 2010). However, a multicenter study

described that there was no difference between the outcomes of patients who received biometry and to those who did not among the Filipino population in the study [9].

Although cataract extraction is cost-effective and has a high success rate, the quality of surgery may result to poor visual outcome [4,11]. Three hundred eighteen patients underwent phacoemulsification with in-the-bag IOL Implantation making it the predominant type of surgery performed. At 1 month post-cataract surgery, 304 (95.60%) patients had good visual outcome, 6 (1.89%) had fair visual outcome, and 8 (2.52%) had poor visual outcome.

One cause of poor visual outcomes includes surgical complications [9,16]. A study in Liberia reported that poor visual outcomes were also associated with implanting ACIOLs [6]. In this study, 20 eyes received phacoemulsification with anterior vitrectomy due to posterior capsular rupture, which is considered as the most common intraoperative complication in cataract surgery [16]. Despite the intraoperative complication, 75% of eyes who had IOLs implanted in the sulcus; and 62.50% of those that had an ACIOL implanted had good visual outcome. However, there were 3 (25%) eyes in the sulcus IOL group, and 1 (12.50%) eye in the ACIOL group that had poor visual outcomes. Furthermore, similar to the majority of eyes that underwent phacoemulsification with anterior vitrectomy, the 2 eyes that presented with a subluxated lens that had ECCE or ICCE with anterior vitrectomy and an ACIOL implant had good visual outcomes.

Pre-existing ocular comorbidities are also causes of poor visual outcomes [6,9,16]. In this study, eleven eyes had a pre-existing ocular condition. Five of these eyes had pre-existing glaucoma making it the most common ocular comorbidity. Two had good visual outcomes, while two had poor visual outcomes. Two patients with macular degeneration had a final visual acuity of fair, while 1 patient with macular scar had a poor outcome. A patient who had a central retinal vein occlusion also had poor visual outcome. It is noteworthy that the visual acuity could still be good in cases where pre-existing ocular conditions are still mild or on early stages [7].

Ukponmwan and her colleagues stated that the most common early postoperative complication is striate keratopathy [16]. This parallels the result of this study as 66 (19.41%) eyes were noted to have had Descemet membrane folds during the early postoperative period. While the cornea of each eye cleared up with the addition of sodium chloride eye drops, 2 eyes failed to gain a good visual outcome. Elevated intraocular pressure (IOP), the second most common postoperative complication in this study, was noted in 10 eyes. Although the rise in IOPs were controlled with IOP lowering eyedrops and were transient, two eyes still had a poor visual outcome.

Some studies reported that uncorrected refractive error was the most common cause of poor outcomes [9,10]. However, refractive error was not considered in this study.

Cataract surgical outcomes are not widely reported in the Philippines. Based on research, there are only two studies that have described local data. It should be emphasized that monitoring visual outcomes after cataract surgery will allow cataract surgeons to identify causes of poor outcome and areas needing of improvement. Moreover, a reduction in the incidence of complications is associated with routine monitoring of cataract surgical outcomes [17].

Conclusion

Overall, the rural eye care facility has achieved the WHO recommendation for adequate visual outcomes of greater than 80% of good visual outcome. This study also goes against the inverse association of old age to gaining a good visual outcome in cataract surgery. However, pre-existing ocular illnesses and surgical complications clearly do contribute to poor outcomes.

In cases of pre-existing ocular comorbidities, it is still possible to gain a good outcome if the ocular condition is still on the early stages [7]. Similarly, in surgical complications such as posterior capsular rupture, good outcomes are also achievable if the surgeon is skilled enough to handle such situations. [9,11] It is important that a surgeon keeps track of surgical outcomes as this may detect aspects that may need improvement; hence, continuously providing a high-quality cataract surgery [17].

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