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Visual Outcome after Cataract Surgery in a South-Eastern Nigerian Tertiary Hospital

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ABSTRACT

Background: Cataract is the leading cause of reversible blindness worldwide.

Aim: To evaluate the visual outcome of cataract surgeries done in a South-Eastern tertiary hospital.

Methodology: The study is a 2-year retrospective study from January 2021 to December 2022. Case notes of all eligible patients that had cataract surgery within the study period were pulled out and relevant information extracted from them. Collected data was analyzed using SPSS version 21. Results were presented in percentages, tables and pie charts.

Results: One hundred and eighty-two eyes were analyzed. Visual outcome continued to improve postoperatively in majority of the patients from first day to 3 months and was even better in some when corrected with glasses or with pinhole. The overall visual outcome was good in 70.3% and poor in 10.4% at 3 months. The major causes of poor visual outcome were aphakia and advanced glaucoma.

Conclusion: The overall visual outcome after cataract surgery in these patients did not meet the WHO standard. Thus, there is need for training and re-training of the cataract surgeons, good patients' selection, in-depth pre-operative work up as well as centre-based provision of needed equipments/ consumables in other to improve the visual outcome.

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Introduction

Cataract refers to opacification of the crystalline lens. It is the leading cause of blindness worldwide as well as in Nigeria [1,2]. The Nigeria National Blindness and Visual Impairment Survey reported that cataract was the most common cause of severe visual impairment and blindness accounting for 45.3% and 43% respectively [2]. The prevalence of cataract-related blindness was 1.8% [2]. Blindness due to cataract is reversible. The definitive treatment is surgery with the implantation of intraocular lens to enable good vision post operatively. Cataract surgery has been shown to be one of the most cost-effective health care interventions [3]. Eye surgeons should not only aim at increasing the quantity of surgeries done, there is need to also monitor the quality of what is being done. Monitoring clinical outcomes is an important step in improving quality of services. The indicators for monitoring cataract programme include the prevalence and incidence of cataract blindness, cataract surgical rate, cataract surgical coverage and visual outcomes [4]. Some factors that will determine the visual outcome after cataract surgery include ocular or systemic co-morbidities that can impair vision, patients' selection, selection of intraocular lens power, surgeons' expertise and complications of surgery.

The World Health Organization (WHO) categorizes the outcome of cataract surgeries into 3 groups: good (visual acuity of 6/6-6/18), borderline (visual acuity of <6/18-6/60) and poor (visual acuity <6/60) [5]. It has also recommended and set targets aimed at achieving good uncorrected visual acuity in at least 80% of surgeries and poor in less than 5%, and corrected visual acuity of good in 90% of surgeries and poor in less than 5% by 2 months after surgery [5]. Good visual outcome after cataract surgery will go a long way in increasing uptake of cataract surgery by patients. Hence, this study aims to assess the visual outcome following cataract surgery in a tertiary hospital in South-East Nigeria as well as cause(s) of poor visual outcome (if any) with a view to improve our quality of services.

Methodology

The study was a two-year retrospective study from January 2021 to December 2022. All consecutive patients who had elective cataract surgery in the ophthalmology department of Enugu State University of Science and Technology Teaching Hospital Parklane (ESUTHP) Enugu within the study period were included in this study. Patients excluded from the study were those below 4 years of age due to poor visual acuity assessment, patients who had combined trabeculectomy and cataract extraction, eyes with no perception of light preoperatively and patients with incomplete

needed information in their case files.

Case files of studied patients were retrieved and the following information were gotten from them: age, sex, occupation, type of cataract, cause of cataract, ocular co-morbidities, co-existing systemic diseases, type of surgery done, the type of intraocular lens inserted, pre-operative Visual Acuity (VA), post-operative visual acuity at day 1, 6 weeks and 3 months, Best Corrected Visual Acuity (BCVA) at 3 months, surgical complications, cause of poor visual outcome. From the case files, all patients had A-scan before surgery and intraocular lens power implanted was estimated from the axial length. The visual outcome was classified according to the World Health Organization recommendation of good outcome being VA 6/6-6/18, borderline (fair) outcome being VA <6/18-6/60 and poor outcome being VA <6/60 [5]. Patients' information was treated with utmost confidentiality.

Microsoft excel was used for data entry and SPSS version 21 program was used for data analysis to calculate values such as frequencies, percentages and mean. Chi-square test was used as a statistical test of significance and p-value <0.05 was considered statistically significant.

Results

About two-third of the patients were aged above 60 years with only about 8% aged 40 years and below. There was a slight male preponderance though the male: female was approximately 1:1 (Table 1).

Table 1: Socio-Demographic Characteristics of Study Participants

Characteristics	Frequency	Percentage(%)
Age(years)	Mean age 62.2 ±15.3years (range 8-100years)	3.3
<20	6	3.3
21-40	9	4.9
41-60	47	25.8
61-80	110	60.4
81-100	10	5.6
Total	182	100.0
Sex		
Males	93	51.1
Females	89	48.9
	182	100.0
Occupation		
Professionals	1	0.5
Business people	85	46.7
Artisans	13	7.1
Public/civil servants	30	16.5
Retirees	44	24.3
Students	9	4.9
	182	100

Majority of the Cataract Based on the Anatomical Location of the Opacity were of Mixed Type and the Commonest Cause of Cataract was Senility (Table 2).

Table 2: Clinical Characteristics of Study Participants

Variables	Frequency	Percentage
Type of Cataract		
Mixed	173	95.1
Posterior Subcapsular	8	4.4
Subluxated	1	0.5
	182	100
Cause of Cataract		
Senile	158	86.8
Developmental	9	4.9
Trauma	9	4.9
Congenital	2	1.1
DM	2	1.1
Dislocated lens	1	0.5
Uveitis	1	0.5
	182	100

Glaucoma and Hypertension/Diabetes Were the Commonest Ocular and Systemic Co-Morbidities Respectively (Table 3).

Table 3: Systemic and Ocular Co-Morbidities of Study Participants

Ocular Co-Morbidities		
None	139	76.5
Glaucoma	34	18.7
Age-Related Macular Degeneration	4	2.2
Maculopathy	1	0.5
Ectopia lentis	2	1.1
Diabetic Macular Edema	1	0.5
Uveitis	1	0.5
	182	100
Systemic Co-Morbidities		
None	131	71.9
Diabetes Mellitus/ Hypertension	10	5.5
Diabetes Mellitus	7	3.8
Hypertension	32	17.6
Retroviral disease	1	0.5
Goitre	1	0.5
	182	100

Most of the Cataract Surgeries Done Were Small Incision Cataract Surgery with Posterior Chamber Intraocular Lens Implant (Table 4).

Table 4: Surgery/Intraocular Lens (IOL) Types

Type of Surgery Done		
Small Incision Cataract Surgery (SICS)	175	96.2
Lens extraction	7	3.8
	182	100
Intraocular Lens (IOL) type Implanted		
None	7	3.8
Posterior Chamber	170	93.4
Anterior Chamber	5	2.8
	182	100

The axial length range of the operated eyes was 19.35 – 25.98 (mean = 23.47 ± 0.98). The intraocular lens power range was 15.00 D – 26.50 D (mean 19.14 ± 1.85). The pre-operative visual acuity in all the operated eyes was < 6/60.

About 70% of the patients had an overall good visual outcome while about 10% had overall poor visual outcome at 3 months post-operative period (Table 5).

Table 5: Visual Outcome over 3 Months after Cataract Surgery

	1 Day PO	**1 Month PO**	**6 Weeks PO**	**3 Months PO**	**BCVA 3 Months PO**	**Overall Visual Outcome**
Poor	77 (42.3%)	32(17.6%)	26(14.3%)	23(12.6%)	19(10.4%)	19(10.4%)
Fair	80(44.0%)	87(47.8%)	77(42.3%)	70(38.5%)	35(19.2%)	35(19.2%)
Good	25(13.7%)	63(34.6%)	79(43.4%)	89(48.9%)	128(70.3%)	128(70.3%)
	182	182	182	182	182	182

PO = Post-Operatively, BCVA = Best Corrected Visual Acuity.

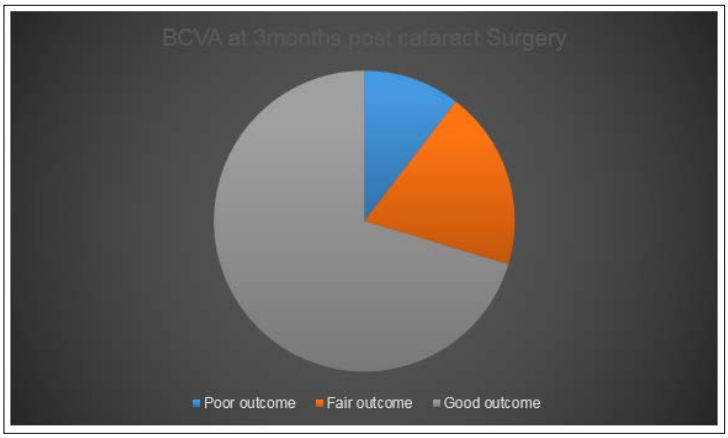

Figure 1: Overall Visual Outcome at 3 months Post Cataract Surgery

The Major Causes of Poor Visual Outcome as Identified were Aphakia (36.8%) and Advanced Glaucoma (26.3%), (Table 6).

Table 6: Causes of Poor Visual Outcome after Cataract Surgery

Cause	**Frequency**	**Percentage**
Aphakia	7	36.8
Advanced Glaucoma	5	26.3
Aphakia/Glaucoma	2	10.5
Diabetic Macular Edema	1	5.3
Uveitis/vitreous loss	1	5.3
Retinal Detachment	1	5.3
Occlusio pupillae	1	5.3
Endophthalmitis	1	5.3
	19	100

There was a significant association between visual outcome and type of cataract, co-morbidities, type of cataract surgery and intraocular lens type. There was no significant association between visual outcome and sex/age (Table 7).

Table 7: Association between Visual Outcome Versus Sex, Age, Type of Cataract, Cause of Cataract, Ocular and Systemic Co-Morbidities, Type of Surgery and IOL

	Outcome			Chi-square	P-Value
	Poor Outcome	Fair Outcome	Good Outcome		
Variables					
Sex					
Male	10(10.8%)	19(20.4%)	64(68.8%)	0.222	0.895
Females	9(10.1%).	16(18.0%)	64(71.9%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Age Groups					
<20	0(0.0%)	2(33.3%)	4(66.7%)	5.616	0.690
21-40	1(11.1%)	2(22.2%)	6(66.7%)		
41-60	4(8.5%)	5(10.6%)	38(80.9%)		
61-80	12(10.9%)	24(21.8%)	74(67.3%)		
81-100	2(20%)	2(20%)	6(60%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Type of Cataract					
Mixed	18(10.4%)	34(1.7%)	121(69.9%)	9.958	0.041
Posterior Subcapsular	0(0.0%)	1(12.5%)	7(87.5%)		
Subluxated	1(100%)	0(0%)	0(0%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Cause of Cataract					
Senile	17(10.8%)	28(17.7%)	113(71.5%)	16.331	0.177
Developmental	0(0.0%)	4(44.4%)	5(55.6%)		
Trauma	1(11.1%)	3(33.3%)	5(55.6%)		
Congenital	0(0%)	0(0%)	2(100%)		
Diabetes Mellitus	0(0%)	0(0%)	2(100%)		
Dislocated lens	1(100%)	0(0%)	0(0%)		
Uveitis	0(0%)	0(0%)	1(100%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Ocular Co-Morbidities					
None	8(5.8%)	27(19.4%)	104(74.8%)	35.373	0.001
Glaucoma	8(23.5%)	6(17.7%)	20(58.8%)		
Age-related macular degeneration	2(50%)	0(0%)	2(50%)		
Maculopathy	0)0%)	0(0%)	1(100%)		
Ectopia lentis	0(0%)	2(100%)	0(0%)		
Diabetic macular edema	1(100%)	0(0%)	0(0%)		
Uveitis	0(0%)	0(0%)	1(100%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Systemic Co-Morbidities					
None	13(9.9%)	27(20.6%)	91(69.5%)	13.260	0.210
Diabetes/ Hypertension	3(30.0%)	4(40%)	3(30.0%)		
Diabetes Mellitus	0(0%)	0(0%)	1(100%)		
Hypertension	3(9.4%)	4(12.5%)	25(78.1%)		
Retroviral disease	0(0%)	0(0%)	1(100%)		

Goitre	0(0%)	0(0%)	1(100%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
Type of Surgery					
SICS	14(8.0%)	33(18.9%)	128(73.1%)	31.39	0.000
Extraction	5(71.4%)	2(28.6%)	0(0.0%)		
	19(10.4%)	35(19.2%)	128(70.3%)		
IOL Type					
None	5(71.4%)	2(28.6%)	0(0.0%)	38.92	0.000
Posterior Chamber	12(7.1%)	33(19.4%)	125(73.5%)		
Anterior chamber	2(40.0%)	0(0.0%)	3(60.0%)		

Posterior Capsular Rent, Hyphema, Vitreous Loss and Displaced IOL were the Commonest Surgical Complications. Displaced IOL, Posterior Capsular Rent and Vitreous Loss Has Significant Effect on the Visual Outcome (Tables 8,9).

Table 8: Surgical Complications that Occurred in the Study Participants

Complication	Frequency	Percentage
None	157	86.3
Displaced IOL	3	1.6
Endophthalmitis	1	0.5
Hyphema	4	2.2
Iris prolapse	2	1.1
Macular edema	2	1.1
Posterior Capsular rent	5	2.7
Raised Intraocular pressure	1	0.5
Retained lens matter	2	1.1
Vitreous loss	3	1.6
Anterior Uveitis	1	0.5
Vitritis	1	0.5
Total	182	100

Table 9: Association between Surgical Complications Versus Visual Outcome

	OUTCOME			P-Value
	Poor Outcome	Fair Outcome	Good Outcome	
Complications				
None	9(5.8%)	33(21.0%)	115(73.2%)	0.000
Displaced IOL	2(66.7%)	0(0%)	1(33.3%)	0.005
Endophthalmitis	1(100%)	0(0%)	0(0%)	-
Hyphema	0(0%)	1(25%)	3(75%)	0.775
Iris prolapse	0(0%)	0(0%)	2(100%)	-
Macular edema	0(0%)	0(0%)	2(100%)	-
PC rent	4(80.0%)	0(0%)	1(20.0%)	0.000
Raised IOP	0(0%)	0(0%)	1(100%)	-
Retained lens matter	0(0%)	0(0%)	2(100%)	-
Vitreous loss	2(66.7%)	1(33.3%)	0(0%)	0.003
Anterior uveitis	0(0%)	0(0%)	1(100%)	-
Vitritis	0(0%)	0(0%)	1(100%)	-

Chisquare cannot be computed because it contains cells with zero count

Discussion

Cataract causes disturbing visual symptoms which may negatively impact on the quality of life of the affected patients. It is the leading cause of blindness worldwide with its attendant psychological, social and financial burdens. Fortunately, blindness due to uncomplicated cataract is reversible following successful surgery.

The present study found that the commonest cause of cataract in the study subjects was senility. This agrees with other studies by Chuka-Okosa et al [6]. The reason for the agreement could be because the two studies were carried out in the same town located in the geopolitical zone. However, the study by Ezegwui et al and Ukponmwan et al done in different geopolitical zones also found senility to be the commonest cause of cataract [7,8]. This could actually mean that senility is the commonest cause of cataract irrespective of location. Although other studies done in other geopolitical zones did not report the commonest cause of cataract [9-12].

The commonest ocular and systemic co-morbidities found in this study were glaucoma and systemic hypertension. This agrees with the findings of some studies [6,7,11]. It was found that 48.9% of patients had good visual outcome at 3 months after surgery which increased to 70.3% with best correction (either with glasses or pinhole). Estimating intraocular lens power from axial length may not have given the best vision. That may be why the vision improved with glasses or with pinhole. Calculation of intraocular lens power from doing proper biometry may have been better. Although our findings did not meet the WHO recommendation but it is comparable to findings of other studies [6,9,10]. In these studies, despite the fact that there were increased percentages of good visual outcome following refraction, none of them met the WHO standard. However, some studies found lower percentages of patients with good visual outcome with best correction when compared with the present study [7,8,11,13]. Poor visual outcome was seen in 10.4% of patients which is much higher than the WHO recommendation of less than 5%. The major causes of poor visual outcome were aphakia and advanced glaucoma which may or may not have been suspected preoperatively. About 9 patients did not have intraocular lens implanted and were left aphakic. This could either be because the surgeons did not have the expertise to implant the intraocular lens in other positions (following posterior capsular rent) like in the sulcus, scleral fixated or iris fixated or that these special types of intraocular lens were not available in the study centre. Most patients came with mature cataract which may have made it difficult to diagnose some posterior segment pathologies until after surgery. However, there was a significant association between the visual outcome and the type of cataract, ocular comorbidities, type of surgery done and the intraocular lens type implanted. Some studies also found unsuspected ocular co-morbities as the main cause of poor visual outcome [7,9,11]. Others found endophthalmitis, couching, uncorrected refractive error and surgical complications as the causes of poor visual outcome [6,10,11,12]. Approximately 14% of the patients had surgical complications with posterior capsular rent, hyphema, vitreous loss and displaced intraocular lens top in the list. However, there was a significant association between visual outcome and posterior capsular rent, vitreous loss and displaced intraocular lens, whereas, there was no significant association between visual outcome and hyphema. Therefore, there is need for more efforts to be put in place in terms of proper patients' selection, provision of needed equipments/consumables, training and re-training of cataract surgeons so as to further improve visual outcome after cataract surgery and ultimately meet the WHO standard [13].

Conclusion

The overall visual outcome following cataract surgery was good but still did not meet the WHO recommendation. The main causes of poor visual outcome were ocular comorbidities and aphakia. Therefore, there is need for training and retraining of ophthalmic surgeons as well as good patients' selection and in-depth pre-operative work up. Adequate post-operative follow-up of these patients is also important and refraction should be done where necessary. All these will help to further improve the surgical visual outcome.

Conflicts of Interest: None

Sponsorship: None.

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