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Original Article

Profile of Cataract Surgical Patients at the National Eye Centre, Kaduna, Nigeria.

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Abstract

Background: Cataract surgery has evolved over the years. This study aims to highlight the profile of the patients that underwent cataract surgery at a tertiary hospital with emphasis on patient demographics, surgical techniques performed, intraocular lens powers implanted, and the complications managed.

Methodology: A retrospective cross-sectional descriptive study of all patients who had undergone cataract surgery within two years at the National Eye Centre, Kaduna, Nigeria. Data extracted from the electronic version of the manual cataract surgical records included the patient's age, sex, comorbidities, technique of cataract surgery performed, the intraocular lens powers implanted, and complications encountered. Intraoperative and postoperative complications up to the twelfth week were considered. All patients had biometry-guided intraocular lens implantation.

Results: One thousand four hundred and seventy- two (1,472) patient records of all ages met the inclusion criteria with a male-female ratio of 1.4:1. The mean age was 51.4 ± 22.6 years. The difference in the mean age of the sexes was statistically significant (p=0.01) and 95% CI was 7.37- 10.40 years. Glaucoma was the commonest ocular comorbidity 142(9.65%) and only 5% (74) had systemic comorbidities. The mean intraocular lens (IOL) power was 19.25 ± 1.8Diopters (Range 10.5D to 26D). The commonest surgery performed was small incision cataract extraction with posterior chamber intraocular lens implant (SICS + PCIOL) 91.2% followed by Trabeculectomy with SICS + PCIOL (3.87%). Phacoemulsification accounted for 2.72% of surgeries. Intra-operative complications were posterior capsular rent in 7.1% (104) and vitreous loss in 4% (58). The commonest post-operative complications were corneal edema6.9% (103) and striae keratopathy 4.6% (68).

Conclusion: Most cataract patients were male, above 50years of age and likely to be older than the females at surgery. The most performed surgical technique was small incision cataract surgery with posterior chamber intraocular lens implantation (SICS + PCIOL) while the mean intra-ocular lens power was 19.25 ± 1.8Dioptres. Globally accepted cataract surgical techniques utilizing recent technological advancements were employed with biometry-guided intraocular lens power calculation and implantation. Complications fell within the accepted global rates.

Keywords: Cataract Surgical Technique; Intra-Ocular Lens Power; Complications; Nigeria.

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Introduction

Cataract is the leading cause of blindness and visual impairment worldwide [1]. In Nigeria, it contributes 43 % to total blindness [2]. Surgery still remains the only method of treatment for cataracts.[3]Cataract surgery is the most common and most cost-effective procedure performed in ophthalmology.[4]The aim of cataract surgery is visual rehabilitation with enhanced visual outcomes and improved quality of life. To achieve this aim, meticulous patient selection, skilled surgery with an emphasis on strict aseptic technique, prompt identification of and proper management of complications with spectacle correction is important. Cataract surgical techniques have evolved over the years. Intra-capsular cataract extraction (ICCE) is still indicated in cases of lens subluxation or dislocation. Aphakic correction following an ICCE could be via anterior chamber intraocular lens (ACIOL), scleral fixated intraocular lens (SFIOL), glued/claw intraocular lens, contact lens, and aphakic spectacles. Each mode of aphakic correction after planned or unplanned ICCE is fraught with likely complications. Most cataract surgeries are presently performed using the extra-capsular cataract extraction (ECCE) technique, but wound construction has ranged from the conventional corneoscleral/ limbal incision, scleral tunnel in small incision cataract extraction (SICS) and clear cornea approach in Phacoemulsification. Each newer method of wound construction has sought to reduce the wound size and invariably shorten the period of post operative rehabilitation. Surgical success is greatly dependent on a biometric guide to intraocular lens power calculation and implantation. To achieve the desired post-operative refractive outcome, corneal curvature and axial length measurement techniques have to be standardized to ensure correct calculation of intra-ocular lens (IOL) power. [5-6]. Complications of cataract surgery are varied. Although each surgeon aims to perform surgeries without complications, the approach to the management of complications is vital to the final outcome of surgeries. In view of the changing trends and improved technology for cataract surgery globally, it is imperative that we evaluate our cataract patients and the surgeries performed at our facility. This study aims to highlight the profile of cataract surgical patients at a tertiary hospital with emphasis on the patient demographics, surgical techniques performed, intraocular lens power implanted, and complications related to cataract surgery.

Methodology

Site of study: Data was collated from the National Eye Centre, Kaduna, Nigeria. The Centre is a training institution, thus surgery was performed by multiple surgeons, both Consultants and Resident doctors in training. Biometry was performed for all patients before the surgery.

Study design: A retrospective cross-sectional descriptive hospital-based study. This study was approved by the research and ethics committee of the hospital and the tenants of Helsinki were observed. The data of all patients who had undergone cataract surgery from January 2017 to December 2018 was assessed from electronic medical records. The Manual Cataract Surgical Record System developed by the International Center for Eye Health; London was used for all patients. Data extracted included the patient's age, sex, visual and systemic comorbidities, type of cataract surgery performed, the intraocular lens power implanted, and complications managed. Patients had systemic comorbidities when these were documented in their review of systems or when they had been undergoing treatment for these ailments. Intraoperative and post-operative complications up to twelve weeks after surgery were considered. Data was imputed into a spreadsheet and analyzed. Records without complete documentation or adequate follow-up were excluded.

Data analysis: Data was imputed into SSPS version 25 statistical software and results were presented in means and percentages. Student t-test was used to compare categorical variables. A confidence interval of 95% was used and a p-value of ($p<0.05$) was significant.

Results A total of one thousand four hundred and seventy-two (1,472) records met the inclusion criteria within the 2-year period under review. The male-female ratio was 1.4:1, and the mean age of patients at operation was 51.4 ±

22.6 years. Sixteen points eight per cent-16.8% (248 were below 16years of age while 67% were above 50yrs of age. The modal age group was 61-70 years (Figure1)

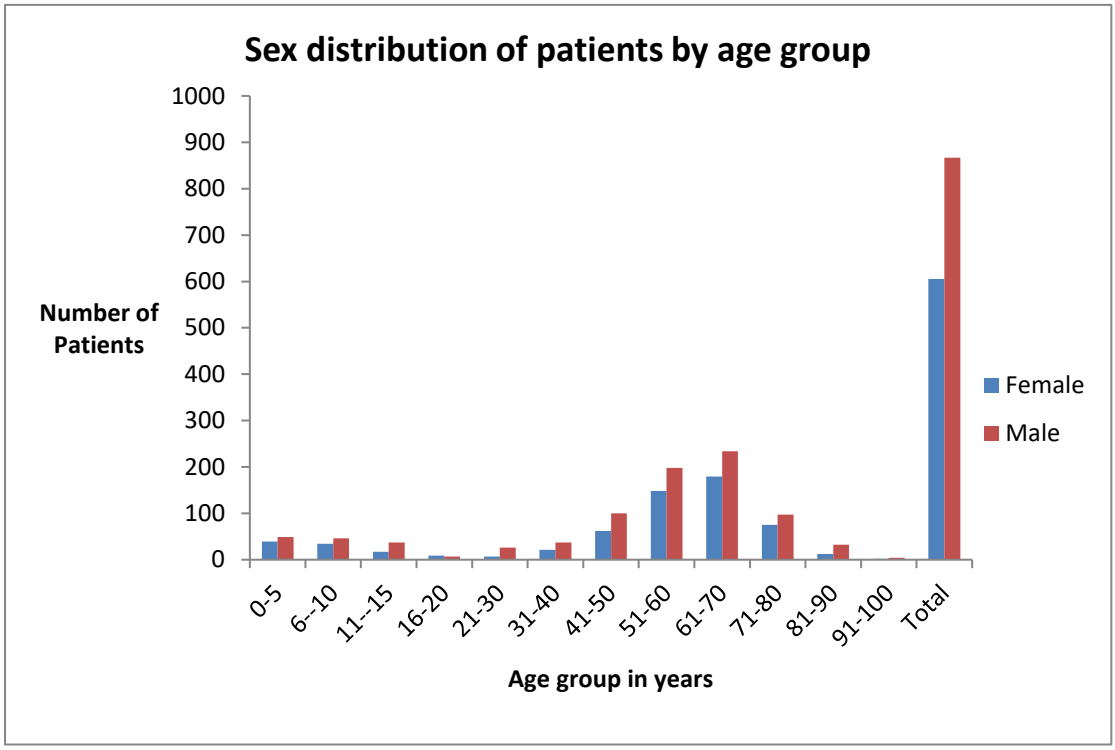

Figure 1: Distribution of cataract patients by age group and sex at National Eye Centre, Kaduna

There was a statistically significant difference (p= 0.01) between the mean age for males (51.2 ± 22. 7years) and females (51.8 ± 22.4years) (Table 1). Also, there was a 95% confidence that the mean difference in age between males and females' patients is between 7.36yrs and 10.40yrs with the males being older at the time of surgery.

Table 1: Distribution of cataract patients by sex at National Eye Centre, Kaduna.

Sex	Number of patients	Mean Age in years	Paired student t-test	Standard error of difference =0.69yrs
Male	867	51.19 ± 22.7	P value = 0.01	T alpha half 95% CI = 2.200985 Upper Confidence Level = 7.36yrs Lower Confidence Level = 10.40yrs
Female	605	51.76 ± 22.4		
Total	1472	51.42 ± 22.6		

Ocular comorbidities were present in 14% (206) of the patients, of which the commonest was glaucoma in 142(9.65%). Systemic comorbidities occurred in 5% (74) of the patients. The commonest systemic comorbidity was hypertension 3.67% (54), followed by diabetes 0.88% (13) while 1398(95%) had no systemic comorbidity (Table 11).

Table 11: Systemic& Ocular Comorbidities of cataract patients at National Eye Centre, Kaduna.

Systemic Comorbidity	N	%	Ocular Comorbidity	N	%
Hypertension	54	3.67	Glaucoma	142	9.65
Diabetes	13	0.88	Corneal lesions	7	0.48
Chronic Renal Failure	7	0.48	Diabetic Retinopathy	5	0.34
Normal	1398	95	Pterygium	5	0.34
			Exotropia	5	0.34
Total	1472	100	Others	42	2.85

The commonest surgery performed was small incision cataract extraction with posterior chamber intraocular lens implant (SICS + PCIOL) in 91.2% followed by Trabeculectomy with SICS + PCIOL in 3.9%. The least performed surgery was Intracapsular cataract extraction with scleral fixated intraocular lens implantation (ICCE + SFIOL) in 0.07%.(Table 111).

Table 111: Type of cataract surgery performed at National Eye Centre, Kaduna.

Type of surgery	Frequency	Percentage
SICS + PC IOL	1343	91.2
Phaco + PC IOL	40	2.72
Trab + SICS +PC IOL	57	3.87
ECCE +PC IOL	25	1.70
ICCE + AC IOL	4	0.27
ECCE + AC IOL	2	0.14
ICCE + SF IOL	1	0.07
Total	1472	100

KEY: Trab- Trabeculectomy. Phaco- Phacoemulsification SF-IOL- Scleral fixated intraocular lens. AC IOL- Anterior Chamber Intraocular lens PC IOL- Posterior Chamber Intraocular lens. ECCE- Extra Capsular Cataract Extraction. ICCE- Intra Capsular Cataract Extraction. SICS- Small Incision Cataract Surgery

Biometry-guided intraocular lens powers inserted ranged from 10.5 to 26Diopters. The mean IOL power was 19.25 ± 1.8D. The commonest implanted IOL was 18D.

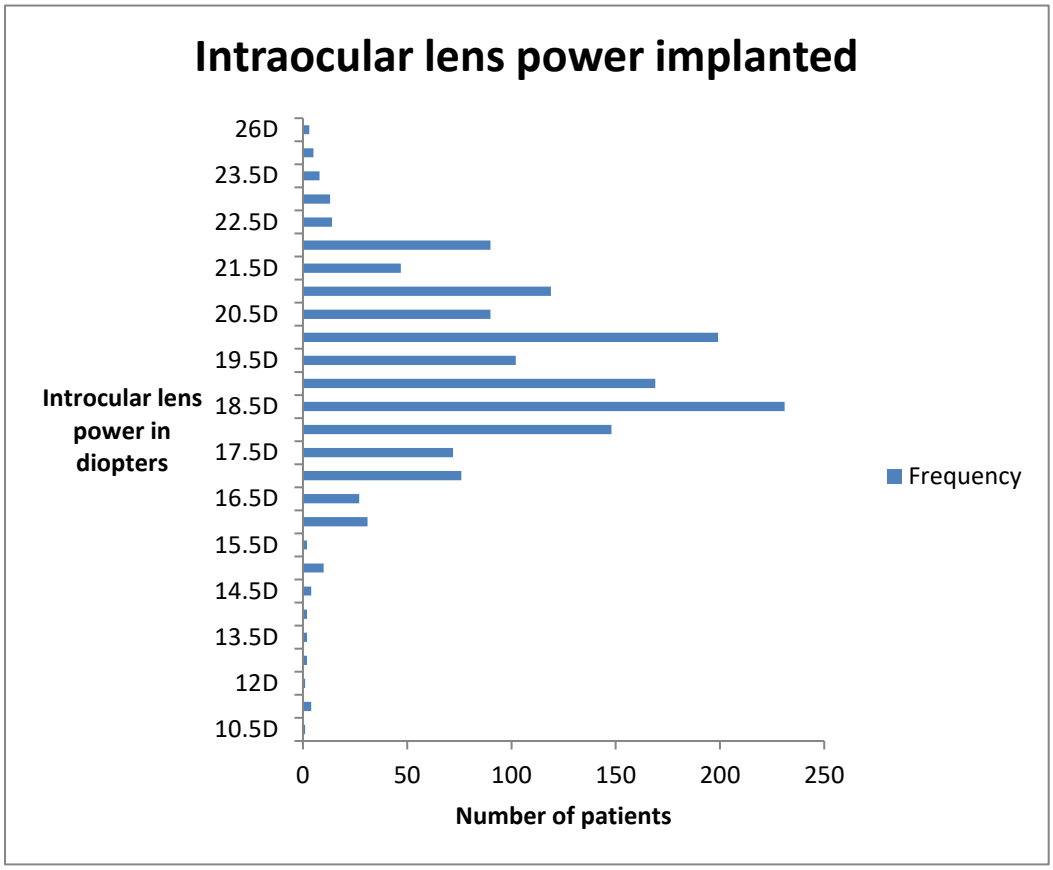

Figure 2: Intraocular Lens Power implanted during cataract surgery at National Eye Centre, Kaduna.

Intra-operative complications were posterior capsular rent (PCR) in 7.1% (104) and vitreous loss in 4% (58). The most rampant post-operative complications were corneal edema in 6.9% (103) and striae keratopathy in 4.6% (68) of patients (Table 1V).

Tables 1V: List of Complications during cataract surgery at National Eye Centre, Kaduna.

Complications	Intra-Operative	Post-Operative	Percentage %
Posterior Capsular Rent	104		7.1
Striae Keratopathy		68	4.6
Corneal Edema		103	6.9
Hyphema		29	1.9
Fibrin Membrane		47	3.2
Toxic Anterior Segment Syndrome		3	0.2
Soft Lens Matter/Cortical Remnant		34	2.3
Iris Prolapse		4	0.3
Dislocated IOL		2	0.1
Acute Iridocyclitis		6	0.4
Anterior Chamber Reaction		9	0.61
Vitreous loss		58	3.98

Discussion:

Of the 1,472 patient records analyzed, there were slightly more males than females with a ratio of 1.4:1. Other studies have reported similar male preponderance with male: female ratios of 1.4:1[7] and 1.1:1[8]. In Kurawa et al's[9]study, however, more females presented for surgery with a male: female ratio of 1:1.3. Silas et al [10]in a review of the genders observed a consistent narrowing gap between the gender pattern of cataract surgical services uptake. The commonest age group was 61 to 70years. The mean age of patients was 51.4 ± 22. 6years.This is similar to 54.2 and 58.5years [11-12], but less than 62.2[7], 61.08, 61.2 and 61.7years [7,8,13,14] from similar studies in Nigeria. A higher mean age of patients (64.47 ± 16.7 years [15]) was observed by AA Ilechie et al in Ghana. The relatively low mean age of participants in our study is likely because the study was not limited to the elderly. All age groups were included and 16.8% of patients were below the age of sixteen (16) years. The mean and modal ages show that the major etiology of cataracts in the above studies is most likely senility. The index study shows a statistically significant difference in the mean age of the sexes (p=0.01). At surgery, male patients were likely to be older than their female counterparts. There was a 95% confidence that the mean difference in age between male and female patients is between 7.36yrs and 10.40yrs with the males being older at the time of surgery. No other study in our locality compared the mean age of the sexes at cataract surgery. In Northern Nigeria

where this study was conducted, males are more likely to access health care than females even at an advanced age since more males are gainfully employed and therefore possess the potential to pay for their surgical needs.

Systemic comorbidities occurred in 5% (74) of the patients. The most common systemic comorbidity was hypertension 3.67% (54), followed by diabetes 0.88% (13). This association is expected since advancing age is a risk factor for senile cataract, hypertension, and diabetes. All patients underwent routine evaluation for systemic comorbidities as standard procedure at pre-operative preparation. Thus, the presence of comorbidities, or the absence thereof, were extracted from documented evidence. Ocular comorbidities were present in 14% (206) of the patients, and the commonest was glaucoma in 142(9.65%). Others were diabetic retinopathy, exotropia, and pterygium. Our findings tally with that of Isawumi et al [7] where glaucoma was the most prevalent comorbidity. Both ocular and systemic comorbidities have the capability to impact the outcome of cataract surgery. This underscores the need to perform a thorough ocular examination, a detailed review of systems, and a general health evaluation before booking a patient for cataract surgery.

The most frequently performed surgical technique was small incision cataract surgery with posterior chamber intraocular lens implantation (SICS + PCIOL) in 91.2% of patients. This is similar to SICS+ PCIOL performed in 83.8% of patients in a Ghanaian study [15] it is also a change from previous Nigerian studies where SICS+ PCIOL was performed in only 28% of the patients [8]. A survey [16] in 2011 showed that only 29.8% of the practicing ophthalmologists in Nigeria were performing small incision cataract surgery. Small incision cataract surgery is not only economical,[17] but almost as effective as phacoemulsification. [18-19] Its faster rehabilitation and improved visual outcome make it an alternative to phacoemulsification in resource-poor economies like India and Africa. Trabeculectomy with SICS +PCIOL was performed in 3.87% of our patients. This was expected since glaucoma was the commonest ocular comorbidity and a triple procedure (Trabeculectomy + SICS + PC IOL) was indicated when target intraocular pressure was not achieved with maximally tolerated medical therapy. Phacoemulsification was performed in 2.72% of patients. With improved training, enhanced expertise, and the appropriate equipment, the number of phacoemulsification surgeries performed in centers across the country is expected to increase. Other less performed surgeries were extra-capsular cataract extraction with posterior chamber intra-ocular lens (ECCE +PCIOL-1.7%), intra-capsular cataract extraction with anterior chamber intraocular lens (ICCE +AC IOL -0.27%) extra-capsular cataract extraction with anterior chamber intraocular lens (ECCE +AC IOL-0.14%), and intra-capsular cataract extraction with scleral fixated intraocular lens (ICCE + SFIOL-0.07%).

Intraocular lens powers inserted ranged from 10.5 to 26 Diopters. The mean intra ocular lens power was 19.25 ± 1.8D. The most implanted intra ocular lens was 18D. Our mean intra ocular lens power is like 19.34 ± 0.28D [20] in Eastern Ethiopia, and 19.45D,[21] of Asian eyes in New Zealand. It was, however, lower than the findings in Pakistan at 21.2±2.35D [22], Nepal at 21.60± 1.74D [23], and North West Ethiopia t 21.12±2.95D [24].

Patients encountered both intra-operative and post-operative complications. Intraoperative complications were mainly posterior capsular rent (PCR) in 7.1% (104) and vitreous loss which occurred in 4% (58). The slightly high incidence of these complications may have been because this data was generated from a teaching facility where surgeries were performed by both trainers and trainees. The fact that trainers

monitored and supervised trainees closely may contribute to these figures being comparatively lower than in other studies. Other studies had similar complication rates of PCR in 6.28%,[7] 6.9% [12], but higher rates of vitreous loss in 27.35%,[7]14.4%[13]. Post-operative complications like corneal edema 6.9% (103), Striae keratopathy 4.9% (68), fibrin membrane, and toxic anterior segment syndrome were transient and amenable to early detection and commencement of appropriate management. The overall documented global rate of PCR is 0.2 to 14% while that of Vitreous Loss is between 1-5% [25]. Studies in India [26] have reported a PCR rate of 7.63% and a United Kingdom Audit [27] showed a vitreous loss rate of 1.1%. Though our surgical complication rate is within the reported values worldwide, improved technology and lower complications reported in recent studies [27] mean we can have even fewer complications and better outcomes.

Conclusion: Most cataract patients were male, above 50 years of age and likely to be older than the females at surgery. Glaucoma was the commonest ocular comorbidity. The mean intra-ocular lens power was 19.25 ± 1.8Dioptres (commonest implanted IOL power was 18Dioptres).The three most performed surgical techniques in descending order were small incision cataract surgery with posterior chamber intraocular lens implantation (SICS + PCIOL), followed by Trabeculectomy with SICS +PCIOL then, Phacoemulsification. Intraoperative complications were posterior capsular rent and vitreous loss while post-operative complications like corneal edema and striae keratitis were transient. Globally accepted surgical techniques utilizing recent technological advancements were employed with biometry-guided intraocular lens power calculation and implantation. Complications fell within the accepted global rates. There is a need to further improve our cataract surgical techniques. Training of trainees and re-training of trainers should help to further reduce the complication rates and better improve our outcomes.

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