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Visual Outcome of Cataract Surgery

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ABSTRACT

Purpose: To assess the visual outcome of cataract surgery in a tertiary hospital in Nigeria.

Methods: Three hundred and seventy eyes (370) that had cataract surgery in the ophthalmology department of University of Benin Teaching Hospital (UBTH) from July 2007 to December 2008 were included in the study. Case records were retrieved and data from them analysed. The age range was 4 to 95 years (mean age 41.1 years). There were 181 males and 189 females .

Senile cataract was the commonest (64.6%) type, followed by traumatic cataract (13%). Extracapsular cataract extraction with posterior chamber intraocular lens (IOL) implant (75.4%) was the commonest procedure, followed by ECCE with anterior chamber intraocular lens implant (11.6%), ECCE without IOL (4.1%) and intracapsular cataract extraction with or without IOL (8.9%).

Results: Preoperative visual acuity was less than 3/ 60 in 73.8% and 6/ 18 – 6/ 60 in 4% of the eyes. The best corrected postoperative visual acuity at 6 weeks was 6/ 6 – 6/ 18 (good outcome) in 161 (43.5%) eyes, borderline in 107(28.9%) and poor in 73 (19.7%). The best corrected visual outcome at 6 months was good in 221 (59.7%), borderline in 59 (15.9%) and poor in 34 (9.3%) eyes. The visual outcome was unknown in 56 (15.1%) eyes.

Conclusion: The visual outcome after cataract extraction in this centre is still less than the WHO recommendation of 90% for best corrected visual acuity of 6/ 6-6/ 18 vision. There is the need for biometry, good patient selection, proper management of complications and spectacle correction of refractive errors in order to improve visual outcome after cataract extraction.

Key words: visual outcome, cataract extraction, intraocular lens implant

INTRODUCTION

Vision loss from cataract represents an estimated 50% or more of the global burden of blindness.[1] Cataract is the most important cause of reversible blindness in people above 40 years of age in Nigeria.[2] It is also known to be the commonest cause of severe visual impairment in this age group.[2] The National Blindness and Visual Impairment Survey conducted in Nigeria between 2005 and 2007 reported the prevalence of cataract blindness to be 1.8%.[2] Cataract was the commonest cause of severe visual impairment and blindness in people aged 40 years and above being responsible for 45.3% and 43% respectively.[2]

The development of cataract is not only genetically determined but also has to do with nutritional status and environmental influences.[3] More blind people exist in developing countries; the majority of them live in the poor rural communities where hospitals and surgical facilities are in great deficit.[2-4] Blindness from cataract increases as the elderly population increases due to increased longevity.[5] The objective of performing cataract surgery is not only to restore visual function at the organ level but also to restore visual functioning and independence to the person.[1] Several studies have reported an association between improved visual function after surgery and improved health related quality of life.[6,7]

To effectively reduce the cataract back log in Edo State, free cataract outreach programmes have become necessary. The Department of Ophthalmology at the University of Benin Teaching Hospital entered into a partnership with a non-governmental organization (Amen Foundation) to commence a free cataract surgery programme in January 2008. Since its inception, the patient turnout for cataract surgery has increased.

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). 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.[8]

This study was designed to find out the visual outcome of patients who had cataract surgery at the University of Benin Teaching Hospital between July 2007 and December 2008 and to assess the success of the free cataract surgery programme. This will also encourage eye surgeons to monitor their own results over time and improve on the visual outcome.

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MATERIALS AND METHODS

All consecutive patients who had cataract surgery in the ophthalmology department of the University of Benin Teaching Hospital (UBTH) from July 2007 to December 2008 were included in this study. Patients excluded from the study were those below 4 years of age due to poorly assessed visual acuities, patients who had combined trabeculectomy and cataract extraction with IOL, eyes with no perception of light preoperatively and patients with incomplete records.

The patients were followed-up for 6 months postoperatively. All patients' files were retrieved, data was recorded and analysed. Three hundred and seventy eyes (370) of 358 patients were included in the study. Demographic data such as age, sex, occupation, tribe, associated systemic/ ocular conditions, preoperative and postoperative visual acuity, systemic and ocular examination findings, type of surgery done and the type of intraocular lens inserted were noted.

The patients were admitted and prepared one day before surgery. General physical and ocular examinations were performed. The patients were given tablets of diazepam 5mg and acetazolamide 250mg the night before surgery. Chloramphenicol eye drops were instilled into both eyes. The patients were given 500mg of acetazolamide tablet on the morning of the operating day. The pupil was dilated with tropicamide or cyclopentolate. Local anaesthesia (facial and retrobulbar), using 2% lignocaine or xylocaine with or without adrenaline and 0.5% bupivacaine, was used for adults while general anaesthesia was used for children. All operations were performed with operating microscopes. No biometry was done because the equipment was not available. The intraocular lens power was calculated from the previous refraction of the patient in the affected eye if available or the other eye, or the lens was selected from a standard stock available in the hospital.

Standard extra capsular cataract extraction (ECCE) with posterior or anterior chamber IOL (PCIOL/ ACIOL) was mostly done. A fornix based conjunctival flap was used. A limbal incision was made superiorly. Viscoelastic material was used to maintain the anterior chamber depth and ringer's lactate was used as irrigating fluid. The IOL inserted was a single piece intraocular lens and the power was between +18.5D and +22.5D. Anterior chamber IOL (AC IOL) was inserted in patients with preoperative subluxated or dislocated cataract or intraoperative rupture of the posterior capsule. Subconjunctival injection of ceftazidime 100mg, gentamicin 20mg and dexamethasone 4mg was given at the end of the operation, ciprofloxacin or chloramphenicol, tropicamide and dexamethasone or bethamethasone eyedrops were instilled at the end of surgery. Postoperative medication included topical antibiotics/ steroid/ mydriatic (ciprofloxacin, chloramphenicol, bethamethasone, tropicamide), oral acetazolamide/ analgesic/ ascorbic acid. Patients without complications after surgery were discharged the next day.

The majority of the patients, 273 (73.8%) were blind with visual acuity < 3/ 60, 15 (4.2%) had visual acuity of 6/ 18 to 6/ 60 and 82 (22.2%) had visual acuity less than 6/ 60 to 3/ 60. There was no patient with visual acuity better than 6/ 18.

The types of cataract were senile cataract in 239 (64.6%) eyes, traumatic/ dislocated cataract in 48 (13%) eyes, post uveitic (complicated) in 37 (10%) eyes, congenital/ developmental in 27 (7.3%) eyes, and diabetic cataract in 19 (5.1%) eyes.

Extracapsular cataract extraction (ECCE) with posterior chamber IOL was performed in 279 (75.4%) eyes, ECCE with AC IOL was performed in 43 (11.6) eyes, ECCE without IOL in 15 (4.1%) eyes, ICCE (intracapsular cataract extraction) with AC IOL in 14 (3.8%) eyes, ICCE without IOL in 19 (5.1%) eyes. Intracapsular cataract extraction was performed in patients with subluxated or dislocated cataract.

Postoperative visual acuity was assessed using the Snellen's chart with or without pinhole (PH) on 1st day post operative (1st DPO), 1 week, 6 weeks, 3 months and 6 months. Postoperative refraction was done at 6 weeks. The visual acuity was classified according to the World Health Organization recommendation of good being 6/ 6-6/ 18, borderline (fair) <6/ 18-6/ 60 and poor <6/ 60.[8]

The data was then analysed using EPI info 13. Frequencies, mean and chi square were calculated. P value ≤0.05 was taken as significant.

RESULTS

The total number of patients operated on during the period was 412. The patients included in the study were 358 and the total number of eyes was 370. There were 346 unilateral cases and 12 bilateral cases. Forty patients were lost to follow up at the end of 6 months. Children less than 4 years were excluded from the study.

There were 181 males and 189 females and the male to female ratio was approximately 1:1. The age range was 4 to 95 years with a mean of 41.1 years. The age distribution of the patients is shown in table 1. The highest number of patients was recorded in age group 61-70 years. The majority of the patients (67.1%) were above 50 years. Forty (40) patients (27 males and 13 females) were lost to follow up.

Table 2 shows the best corrected visual acuity of the patients on the 1st postoperative day, and at 1 week, 6 weeks, 12 weeks and 24 weeks (6 months) post op. The visual acuity was 6/ 6-6/ 18 in 30 (8.1%) eyes on the 1st day post op and this increased to 221 (59.7%) eyes at the end of 6 months. Visual acuity <6/ 18- 6/ 60 was recorded in 67 (18.2%) eyes on the 1st day post op and this reduced to 59 (15.9%) eyes at 6 months. On the first day post op, visual acuity <6/ 60 was present in 273 (73.8%) eyes and it reduced to 34 (9.2%) at 6 months. The best corrected VA of 6/ 6-6/ 18 was present in 161 (43.5%) eyes at 6 weeks, 202 (54.6%) eyes at 3 months and 221 (59.7%) eyes at 6 months. Visual acuity less than

3/ 60 to light perception was present in 79 eyes on the 1st day post op and this number reduced to 13 at 6 months. Nineteen (19) eyes were lost to follow up at 6 weeks and this increased to 40 at 6 months. The total number of eyes at 6 months was 330.

Table 1. Age distribution of the patients

Age Range	No of Eyes	Percentage
1 - 10	39	10.5
11 - 20	15	4.1
21 - 30	12	3.2
31 - 40	21	5.6
40 - 50	35	9.5
51 - 60	82	22.2
61 - 70	111	30.0
71 - 80	37	10.0
>80	18	4.9
Total	370	100

Table 3 shows the visual outcome at 6 months in patients aged less than 50 years of age and greater than 50 years of age, and according to sex. There was no statistically significant difference in terms of visual outcome between those aged less than 50 years and patients above 50 years of age (P=0.0801). There was no statistically significant difference in visual outcome between the males and females (P=0.9789). The table also shows the type of cataract and the visual outcome at 6 months. Patients with senile cataract had the highest number of good visual outcome.

The pre-existing systemic diseases were hypertension in 93 patients, diabetes in 34 patients, cardiovascular disease in 2 patients and HIV/ AID in 9 patients. Two hundred and forty-four patients did not have any systemic disease. Some of the patients had more than one systemic condition. The pre-existing ocular conditions were glaucoma in 47 eyes, uveitis in 28 eyes, age related maculopathy in 212 eyes, diabetic retinopathy in 15 eyes, hypertensive retinopathy in 13 eyes and retinal detachment in 1 eye. Some patients had multiple disease conditions. There was no pre-existing disease in 96 eyes. The visual outcome was good in 169 (79.7%) of the eyes with age related maculopathy. Only 6 out of the 212 eyes had poor visual outcome. Fourteen (14) out of the 28 eyes with uveitis had poor visual outcome. There was a significant difference in visual outcome between eyes with uveitis and those without uveitis ($p<0.0001$).The visual outcome was good in 9 eyes with glaucoma, fair in 32 eyes and poor in 4 eyes. There was a significant difference in the visual outcome between eyes with glaucoma and those without ($p<0.0001$) Two patients did not come for follow up.

The commonest intraoperative complication seen in this study was posterior capsular rent in 31 eyes (8.4%). It was associated with vitreous loss in 25 eyes and without vitreous loss in 6 eyes. The other intraoperative complications were stripping of descemets membrane in 18 eyes (4.8%), hyphaema in 8 eyes (2.2%), zonular dehiscence and retinal detachment in 1 eye each. The early and late postoperative complications are shown in table 4. Two hundred and thirty nine eyes (239) developed early postoperative complications ranging from striate keratopathy in 158 eyes (42.7%) to endophthalmitis in 2 eyes (0.6%). The visual outcome was fair in the two eyes with endophthalmitis. There was early resolution of striate keratopathy without any effect on the visual outcome in all the patients. The commonest late post operative complication was cystoid macular oedema in 9 eyes (2.4%). The visual outcome was fair in 6 of the 9 eyes and poor in 3 eyes. Five (5) out of the 6 eyes with posterior capsular opacification had poor vision.

Table 2. Visual acuity on 1st post-operative day, 1 week, 6 weeks, 12 weeks (3 months), 24 weeks (6 months)

VA	1st DPO	%	1 wk	%	6 wks	%	3 mths	%	6 mths	%
$^{6}/_{6} - ^{6}/_{18}$	30	8.1	79	21.4	161	43.5	202	54.6	221	59.7
$<^{6}/_{18} - ^{6}/_{60}$	67	18.2	131	35.4	107	28.9	75	20.2	59	15.9
$<^{6}/_{60} - ^{3}/_{60}$	194	52.4	128	34.6	55	14.9	32	8.6	21	5.7
$<^{3}/_{60}$– HM	48	12.9	17	4.6	7	1.9	6	1.7	5	1.4
LP	31	8.37	15	4.05	11	2.97	7	1.89	8	2..16
VA not recorded	0	0	0	0	10	2.7	19	5.1	16	4.3
Lost to follow-up	0	0	0	0	19	5.2	29	7.8	40	10.8
TOTAL	370	100	370	100	370	100	370	100	370	100

Table 3. Visual outcome at 6 months in relation to age, sex and type of cataract

Visual Outcome	Good	%	Fair	%	Poor	%	Lost to Follow Up	%	Total
Age									
Less than 50 years	78	63.9	22	18.1	15	12.1	7	5.7	122
> 50 years	113	45.6	66	26.6	36	14.5	33	13.3	248
Sex									
Male	81	44.8	40	22.1	33	18.2	27	14.0	181
Female	85	45.0	48	25.4	43	22.7	13	6.9	189
Type of Cataract									
Senile	121	50.6	65	27.2	45	18.8	8	3.34	239
Traumatic	7	14.6	11	22.9	18	37.5	12	25.0	48
Dislocated Diabetic	8	42.1	3	15.8	2	10.5	6	31.6	19
Post Uveitic	5	13.5	6	16.2	16	43.2	10	27.1	37
Congenital	5	18.5	17	63.0	1	3.7	4	14.8	27

Table 4. Post-operative complications

Complications	No of eyes	%
Early post-operative complications		
Striate keratipathy	158	42.7
Cortical remnants	33	8.8
Shallow anterior chamber	12	3.2
Post-operative uveitis	11	3.0
Conjunctival discharge	9	2.4
Elevated IOP	5	1.4
Endophthalmitis	2	0.6
Pupillary capture	2	0.6
Nil	131	35.4
Total	370	100.0
Late post-operative complications		
Cystoid macular oedema	9	2.4
Elevated IOP	6	1.6
Posterior capsular rent	6	1.6
Pupillary membrane	3	0.8
Ocular hypotony	2	0.5
Bullous keratopathy	2	0.5
Phthisis bulbi	1	0.3
Lost IOL	1	0.3
Retinal detachment	1	0.3
Nil	299	80.8
Lost to follow up	40	10.8
Total	370	100.0

DISCUSSION

More females than male patients had cataract surgery in this study although the ratio was 1:1 contrary to other reports from Nigeria which show a male preponderance in the uptake of cataract surgical services.[11-13] This is likely to be due to the free cataract surgery programme which was introduced in the hospital thus making cataract surgery accessible and easily affordable to both male and female patients.

Patients above 50 years of age constituted 67.02% and the highest number was in the age group 61-70 years, similar to other studies which also reported that senile cataract was the commonest type of cataract.[12,13] Adio[12] reported that 66.6% were above 50 years. The least number of patients was between 11 and 20 years and 40.1% of them presented mainly with complicated cataract.

Senile cataract was the commonest type of cataract affecting 64.6% of eyes in this study. ECCE/ PCIOL was highest because it is the usual type of surgery done. The other types of surgery are usually done in complicated cases such as subluxated or dislocated cataract or for patients with intra operative complications such as posterior capsular rent with vitreous loss. This result is similar to other studies.[11-14]

The majority of eyes, 273 (73.8%), had a presenting visual acuity of <3/ 60 and this reflects the reluctance of patients in Nigeria to undergo cataract surgery unless they are blind. This is similar to reports from other studies.[11-14] Adio[12] reported that 93% of the eyes in their study had presenting visual acuity of 3/ 60 or less while Nwosu[11] reported 87.8%. Patients should be encouraged to undergo cataract surgery earlier before becoming blind to reduce the unnecessary hardship and the economic burden to themselves, their families, and the society as a whole. They should be told of the availability of free cataract surgery and the public should be informed about the services rendered in ophthalmic hospitals or eye centres near them.

The visual acuity of the patients gradually improved in 30 eyes (8.1%) ,with 6/ 6-6/ 18 on the first post-operative day to 202 eyes (54.6%) at 3 months post op to 221 (59.7%) at 6 months post op. This improvement was as a result of the

resolution of ocular inflammation from surgery and correction of any refractive error by the provision of adequate and proper spectacle correction. Various studies have shown similar improvement in visual acuity over time.[11-15] It took an average of 2-3 months with a range of 2-5 months in the study by Nwosu[11] for the patients to achieve optimal vision post-operatively. A pilot study carried out showed that optimal visual outcome was reached at 6 months or more after cataract surgery and that the WHO visual outcome targets are realistic.[16] Chirambo,[16] in a pilot study, reported presenting good visual outcome in 66.5% and best corrected visual outcome in 80.2% between a 1 to 7 week post operative period, best borderline of 15.6% and poor best visual outcome of 4.3%. The visual outcome improved to best corrected good visual outcome of 91.1%, borderline of 4.2% and poor visual outcome in 4.7% at 26 weeks and above in the postoperative period.[16] Limburg et al.[15] reported that 31% of eyes had good visual outcome at discharge and this improved to 69% at 8 weeks or more in the postoperative period while poor outcome was 17% at discharge, and decreased to 5% at 8 weeks or more in the postoperative period. Adepoju[17] reported good visual outcome of 83.3% at one year.

The reasons for the improvement of visual acuities after 6 weeks postoperatively were the resolution of intraocular inflammation resulting from surgery and the correction of residual refractive error. The visual outcome at 6 months revealed that 35.3% of patients with good visual outcome were less than 50 years of age while 51.3% were older than 50 years. There was no statistically significant difference between the two groups in terms of visual outcome. Adio[12] also reported that the visual outcome seemed better in patients older than 50 years of age. The visual outcome has been reported to be poorer in those less than 50 years of age and older than 80 years of age at the time of surgery.[2]

Patients with senile cataract had good visual outcome in 51.9%, fair in 27.9 % and poor in 16.5%, while in eyes with traumatic cataract, the visual outcome was good in 14.6%, fair in 22.9% and poor in 37.6%. The highest numbers of patients with good visual outcome were those with senile cataract. This is because most of them are uncomplicated cataract. Other studies have also reported better visual outcome in patients with senile cataract compared to the visual outcome in other types of cataract.[12]

WHO recommended that for adequate visual outcome results, the postoperative visual acuity of good, 6/ 6 – 6/ 18 with available correction, should be greater than 80% and with best correction, it should be greater than 90%, borderline (fair) outcome: <6/ 18–6/ 60 with available correction, it should be less than 15% and less than 5% with best correction. Poor outcome <6/ 60 with available correction should be less than 5% and with best correction >5%.[8]

The good visual outcome of 59.7% at 6 months postoperatively in our study is less than the WHO recommendation but is similar to the outcome in other studies from Nigeria.[11-13] Bekibele[13] reported good visual outcome with correction in 55.7% while Nwosu[11] reported that 58.9% had good visual outcome.

The main reasons for poor visual outcome following cataract surgery are poor case selection, surgical complications, uncorrected refractive error and post operative complications.[18,19] The use of standard intraocular lens powers instead of calculating the powers by biometry also contributed to the poor visual outcome. The outcome in eyes with significant other pathology is likely to be poor. In this study, 14 out of the 28 eyes with complicated cataract from uveitis had poor visual outcome. The visual outcome was good in only 9 (19.1%) out of the 47 eyes with glaucoma, fair in 32 (68.1%) eyes and poor in 4 eyes. The visual outcome was good in 169 out of the 212 eyes with age-related macular degeneration, fair in 31 eyes and poor in 6 eyes. The presence of age related macular degeneration has been highlighted as an important risk factor for poor visual outcome after cataract extraction.[20] The improvement in visual acuity after cataract extraction in eyes with age-related macular degeneration depends on the severity of the disease.[21] Ferooghian et al.,[21] in their study on visual outcome in patients with AMD, reported a statistically significant gain in visual acuity in patients with AMD and the degree of improvement varied with the severity of the disease. Patients with mild AMD gained more letters compared to those with advanced AMD. This demonstrates the effect that existing ocular diseases can have on the visual outcome after cataract surgery. A thorough ocular examination before surgery is very important to detect existing ocular diseases. It is important to inform the patient about the risk and probability of poor outcome following surgery. Complications at the time of surgery or post-operatively are also responsible for much of the visual impairment in operated eyes. The commonest late post operative complication in this study was cystoid macular oedema in 9 (2.4%) eyes, and 6 of these eyes had fair vision. Posterior capsular opacification occurred in 6 eyes (1.6%), 5 of which had poor vision. The visual acuity can be improved in eyes with posterior capsular opacification by Neodynium yag laser capsulotomy or by non laser capsulotomy using a 25G capsulotomy needle.[22]

From the perspective of the patient, the reason behind the poor outcome is less important than the fact that poor vision exists. The patient may not be able to distinguish between vision deterioration associated with onset of new ocular pathologies versus that associated with surgical complications or undetected coexisting disease. Patients with poor vision may conclude that cataract surgery is only partially or temporarily effective in restoring sight. We must do more to ensure that to the greatest extent possible, the result is complete sight restoration. The need to produce consistently good surgical outcomes is becoming important as patients in developing countries are increasingly seeking cataract surgery earlier before severe visual impairment.

Better outcomes of cataract surgery will reduce fear and motivate more patients to come for surgery as there is improvement in the patient's quality of life after cataract

surgery.[23]

Although a good number of patients in this study had good visual outcome, it is still below the WHO recommendation of 90% with best correction, thus there is a need for good patient selection, biometry so that the correct power of IOL is inserted, reduction in the number and proper management of complications, proper surgical technique to reduce post-operative astigmatism. and adequate correction of post operative refractive errors. There is a need for regular monitoring of cataract visual outcome and surgeons should be encouraged to monitor their own results over time and identify causes of poor outcome. Addressing these causes will improve the future outcome of cataract surgeries and lead to better outcome. Better results will reduce fear and motivate more patients to come for cataract surgery.

There is also a need to improve awareness of members of the community about the good visual outcome associated with cataract surgery and encourage them to seek surgery earlier before the onset of severe visual impairment or blindness, which will have significant economic and social impact on their lives. The availability of free cataract surgery at the University of Benin Teaching Hospital should be highly publicised to increase the uptake of cataract surgical services at the hospital, reduce the need for the use of harmful traditional eye medications and couching which have adverse effect on visual outcome after cataract surgery.

CONCLUSION

Cataract services uptake at the University of Benin Teaching Hospital has improved significantly since the inception of the free cataract surgery programme

The result of this study shows that although visual outcome was good in many (59.7%) patients, it is still below the WHO recommendation of best corrected good visual outcome of 90%. Good patient selection, preoperative biometry, reduction of surgical complications and sequelae, appropriate spectacle correction, meticulous preoperative, intraoperative and postoperative care of the patients will ensure that the WHO recommendation is achieved.

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