

Original Article

Visual outcome and patient satisfaction with cataract surgeries in Kaduna, Nigeria.

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Abstract

Background: Cataract is the commonest cause of severe visual impairment and blindness in Nigeria. Treatment of cataract is by surgery, and the aim of cataract surgery is visual restoration. Visual improvement and patient satisfaction are outcome measures that can be used to determine the quality of cataract surgery. **Objective:** To assess visual outcome and patient satisfaction with cataract surgeries in Kaduna State, Nigeria. **Methodology:** This was a prospective hospital-based study of patients who had cataract surgery by three different eye care providers in Kaduna State between September and November 2021. Patients' surgeries years and above without any ocular co-morbidities who were scheduled for cataract surgery were included in the study. All patients had complete ocular examinations using a pen torch and slit lamp biomicroscope. A semi-structured, pre-tested interviewer-administered questionnaire was administered to all patients. Data obtained was entered and analysed using STATA version 15. **Results:** A total of 165 patients from the three facilities participated in this study. Their mean age was 64.54±9. The vision improved post-operatively in all three facilities. Eight weeks post-operatively, the best corrected visual acuity was a good outcome in 86.3% of patients in the National Eye Centre, 70.7% in Gambo Sawaba General Hospital, and 80% in AMA Foundation, with an improvement in patient satisfaction from baseline. There was no statistical difference among the three facilities in visual outcome (Chi-square; $p>0.05$). The Catquest-9SF score revealed improvement in patient satisfaction postoperatively. This difference was statistically significant in all three facilities ($p=0.001$). **Conclusion:** Cataract visual outcome was relatively good in all three centres, with good patient satisfaction

Keywords: *Cataract surgery, Patient satisfaction, Visual outcome*

Introduction

The Nigerian National Blindness and Visual Impairment survey showed cataracts to be the commonest cause of severe visual impairment and blindness, responsible for 45.3% and 43% respectively.¹ Globally, at least 2.2 billion people have visual impairment, and of these, at least 1 billion people have a visual impairment that could have been prevented or is yet to be addressed.² About 65.2 million people have visual impairment due to cataracts. Treatment of cataracts is by surgery, and various surgical techniques are in use.³ Extracapsular cataract extraction became widely available in the

1980s. Manual small incision cataract surgery, a sutureless extracapsular extraction technique, is the preferred method in developing countries in the hands of surgeons who have been trained over the last decade and has been proven to be the most cost-effective.⁴ Phacoemulsification is currently the predominant surgical technique in developed countries and is gaining popularity in developing countries.⁵

Cataract surgery is the most common procedure performed by ophthalmic surgeons and one of the most common surgical procedures worldwide.⁶

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This study aimed to assess the visual outcome and Patient satisfaction with cataract surgeries in Kaduna State, Nigeria. Visual outcome of cataract surgery and patient satisfaction with cataract surgery are outcome measures for determining the quality of cataract surgery and, hence, the study.

Materials and methods

The study was carried out at 3 eye care facilities in Kaduna State, namely National Eye Centre Kaduna (a tertiary health facility), Aminu Musa Abdulsalam (AMA) Foundation, and Gambo Sawaba General Hospital Zaria (a secondary healthcare facility). AMA Foundation is a registered, privately funded, non-governmental, and non-profit organization (NGO) in Kaduna that is focused on various sectors of socio-economic growth and development of society. In the healthcare sector program, their focus is on eye care treatment of minor ailments, dispensing of reading glasses, cataract surgery, and screening. They can do this in collaboration with trained ophthalmologists from the National Eye Centre, Kaduna, and have carried out various activities in 22 states of Nigeria. The surgeries for AMA were carried out at Railway Hospital, Zaria.

It was a facility-based prospective study of visual outcome and satisfaction with cataract surgery in patients who had cataract surgery at the 3 eye care centres in Kaduna State, Nigeria, between September and November 2021. Ethical approval for the study was obtained from the Research and Ethics Committee of the National Eye Centre, Kaduna. Study permission was obtained from the Kaduna State Ministry of Health and AMA Foundation. Informed consent was sought and obtained from all patients before surgery. Inclusion criteria were adult patients aged 40 years and above who were willing to undergo cataract surgery in at least one eye and agreed to come for follow-up. Patients who were unwilling to participate in the study, those with poorly controlled diabetes mellitus, hypertension, and hyperlipidaemia, and those with associated ocular co-morbidity, e.g., trauma, corneal scar, and glaucoma, were excluded from the study. The sample size was calculated using the formula $n = (Z^2pq/d^2) \times D$, where n is the sample size, Z is standard normal deviation at 95% confidence interval (1.96), p is the proportion (prevalence) of the population with cataract blindness in those over 40 years, q is the proportion (prevalence) of the population estimated not to have cataract blindness, d is degree of precision of 3% and D is design effect. The sample was calculated to be 165, including a nonresponse of 10%. All consecutive adults who met

the eligibility criteria were recruited for the study until the required sample size was obtained. The sample size in each institution was based on the percentage of the number of surgeries performed per year. The National Eye Centre had 51 patients, GSGH had 99 patients, while AMA had 15 patients. All patients had complete ocular examinations of both eyes, including visual acuity using the Snellen or Tumbling E chart as appropriate, and pen torch assessment. A slit lamp was used to examine both eyes and measure the intraocular pressure using a Goldman applanation tonometer, and with a +78D to examine both fundi after application of mydriatic eye drops - Tropicamide 1% and Phenylephrine 2.5% if visible. A pilot study was conducted on 15 randomly selected patients at Barau Dikko Teaching Hospital, Kaduna. The questionnaires were pre-tested to assess ease of administration and comprehension, and study feasibility. The pre-tested interviewer-administered questionnaire, along with the informed consent for the study, was administered to the eligible patients both pre-operatively and on post-operative visits by two trained ophthalmology resident doctors. A kappa score of 0.7 was used to assess competence between the two ophthalmology residents. The first section includes patient demographics such as age, sex, marital status, level of education, and occupation. The Catquest section assessed the level of difficulties due to impaired sight in connection with certain everyday tasks. For all categories, the rank of a single item is represented on an ordinal scale. Ranks representing frequency and intensity have the following meaning: 1 represents the highest activity or lowest disability level (= best option), and the highest-ranking figure represents the lowest activity or highest disability level (= worst option). For this study, answers about activities were evaluated separately. The response choices were ranked from 4 to 1 (no activity = 4; low activity = 3; moderate activity = 2; high activity = 1). There is no "cannot say" option in this area. All activity ranks before the operation were compared with postoperative ranks. Patients were admitted only after surgery at Gambo Sawaba General Hospital, Zaria, for one night, while they came in as outpatients at the National Eye Centre, Kaduna, and AMA Foundation. All patients at Gambo Sawaba General Hospital and AMA Foundation did not have biometry before surgery due to the unavailability of the machine; posterior intraocular lenses ranged from 19 - 21.5D or the same as the other eye if a previous intraocular lens card was available.

Patients recruited had surgery over three weeks and

followed up for eight weeks. Visual acuity was measured on the first post-operative day, at one week, and at eight weeks using Snellen and tumbling E chart and with refraction done at discharge (eight weeks, this was based on WHO criteria who advises measurement of visual acuity any time, between discharge and 12 weeks postoperatively using available and best correction)⁷ with auto refractometer (NIDEK ARK-510A autoref/keratometer, serial no.333676, made in Japan). Visual outcome was categorized using the World Health Organisation (W.H.O) standard, where good vision was classified as 6/6 to 6/12, moderate vision from less than 6/12 to 6/60, and poor vision as less than 6/60.⁷

These values were subsequently converted into log MAR for analysis, and by assigning a value of 1.85 log MAR to counting fingers and 2.3 log MAR to vision of hand movements or less, as documented from other studies. Surgeries were performed by consultants only at the National Eye Centre and the AMA Foundation, and by consultants and senior registrars at Gambo Sawaba General Hospital; all surgeries performed by senior residents were excluded. Patients were offered Phacoemulsification (PHACO) and Manual Small incision cataract surgery (MSICS) with intraocular lens (IOL) implantation at National Eye Centre, Kaduna, small incision cataract surgery at AMA Foundation, and small incision cataract surgery and Extracapsular cataract extraction (ECCE) at Gambo Sawaba General Hospital. All intraoperative

complications were also recorded.

Data was entered and analysed using STATA version 15. The raw data were checked for completeness, coded, and cleaned to identify errors during collection and entry. Frequencies, percentages, and proportions were used for quantitative variables. The categorical variables were assessed using the chi-square, while the continuous variables were assessed using the student t-test. A p-value of <0.05 was considered statistically significant.

Results

A total number of 165 patients participated in the study; of these, 99 patients were from the Gambo Sawaba General Hospital (GSH) group, 51 from the National Eye Centre (NEC) group, and 15 from the Aminu Musa Abdulsalam (AMA) foundation group. Most of the patients were between the ages of 61 and 80 years (61.80%) with a mean age of 64.54±9.91yrs. National Eye Centre had a mean age of 66.61±8.16, Gambo Sawaba Hospital was 64.12±9.90 and AMA Foundation was 60.33±13.90 which were statistically not significant. There was no statistically significant difference in the gender distribution in the three groups. More than half of the patients had Qur'anic education (58.20%) while only 12.10% and 10.30% had tertiary and primary education, respectively. More than eighty-one percent (81.20%) of the patients were married, and 18.80% were either divorced or widowed. Table 1 shows the socio-demographic characteristics of the study population.

Table 1: Socio-demographic characteristics of the study population

		NEC (n=51)	GSH (n=99)	AMA (n=15)	TOTAL (n=165)
Age	40-60	15(29.4%)	35(35.4%)	8(53.3%)	58(35.2%)
	61-80	33(64.7%)	63(63.6%)	6(40%)	102(61.8%)
	>80	3(5.9%)	1(1%)	1(6.7%)	5(3%)
Sex	Male	24(47.1%)	53(53.5%)	7(46.7%)	84(50.9%)
	Female	27(52.9%)	46(46.5%)	8(53.3%)	81(50.1%)
Level of Education	Tertiary	11(21.6%)	9(9.1%)	0	20(12.1%)
	Secondary	7(13.7%)	9(9.1%)	1(6.7%)	17(10.3%)
	Primary	8(15.7%)	13(10%)	3(20%)	24(14.5%)
	Quranic	22(43.1%)	63(63.6%)	11(73.3%)	96(58.2%)
	None	3(5.9%)	5(5.1%)	0	8(4.8%)
Marital status	Married	40(78.4%)	82(82.8%)	12(80%)	134(81.2%)
	Single	0	0	0	0
	Divorced	11(21.6%)	17(17.2%)	3(20%)	31(18.8%)
	/Separated/ widowed				

Table 1: Socio-demographic characteristics

Patients in NEC were offered PHACO and MSICS, MSICS and ECCE in GSH, and only MSICS in the AMA foundation. (Table 2) Only 2 patients had phacoemulsification cataract surgery, while 90.9% of the patients in the study had MSICS, and 7.9% had ECCE. All patients had posterior chamber (PC) intraocular lens implantation.

Table 2: Types of Cataract Surgery

The unaided visual outcome on the first post-operative day showed that 33.3% had good vision at the National Eye Centre, Kaduna, 9.1% at Gambo

Sawaba General Hospital, Zaria, and 20% at AMA Foundation, while 47.1% had borderline vision at the National Eye Centre, Kaduna, 64.6% at Gambo Sawaba Hospital Zaria, and 53.3% at AMA Foundation. Only about 19.6% had poor vision at the National Eye Centre, 26.3% at Gambo Sawaba General Hospital, and 26.7% at the AMA Foundation. The vision improved by the 1st post-operative week and further improved by the 8th post-operative week in all three facilities. There is no statistical difference among the three facilities in visual outcome (Chi-square; $p > 0.05$; Table 3).

Table 2: Types of Cataract Surgery in the study population

	NEC	GSH	AMA	Total
PHACO	2(3.9%)	0(0.0%)	0(0.0%)	2(1.2%)
MSICS	49(96.1%)	86(86.9%)	15(100.0%)	150(90.9%)
ECCE	0(0.0%)	13(13.1%)	0(0.0%)	13(7.9%)
Total	51(100%)	99(100%)	15(100%)	165(100%)
Chi-Square Test χ^2 Value (13.601), df (4), P-value (0.009)				

Table 3: Visual acuity on 1st day, 1 week, and 8 weeks post cataract surgery in the study population

	NEC	GSH	AMA	Total
UNAIDED VA 1DAY POST-OP				
6/6-6/12	17(33.3%)	9(9.1%)	3(20.0%)	29(17.6%)
6/12-6/60	24(47.1%)	64(64.6%)	8(53.8%)	96(58.2%)
<6/60	10(19.6%)	26(26.3%)	4(26.7%)	40(24.2%)
Total	51(100%)	99(100%)	15(100%)	165(100%)
Chi-Square Test χ^2 Value (13.821), df (4), P-value (0.008)				
UNAIDED VA AT 1WEEK				
6/6-6/12	20(39.2%)	20(20.2%)	5(33.3%)	45(27.3%)
6/12-6/60	21(41.2%)	57(57.6%)	8(53.3%)	86(52.1%)
<6/60	10(19.6%)	22(22.2%)	2(13.3%)	34(20.6%)
Total	51(100%)	99(100%)	15(100%)	165(100%)
Chi-Square Test χ^2 Value (6.961), df (4), P-value (0.138)				
UNAIDED VA AT 8WEEKS				
6/6-6/12	36(70.6%)	44(44.4%)	8(53.3%)	88(53.3%)
6/12-6/60	11(21.6%)	40(40.4%)	5(33.3%)	56(33.9%)
<6/60	4(7.8%)	15(15.2%)	2(13.3%)	21(12.7%)
Total	51(100%)	99(100%)	15(100%)	165(100%)
Chi-Square Test χ^2 Value (9.251), df (4), P-value (0.055)				

Figure 1 showed the best corrected visual acuity at eight weeks post-operatively, with good outcomes in 86.3% in the National Eye Centre, 70.7% in Gambo

Sawaba General Hospital, and 80% in AMA foundation patients, while they had borderline vision in 9.8% in the National Eye Centre, 14.1% in Gambo

Sawaba General Hospital, and 13.3% at AMA foundation. The proportion of patients with poor visual outcomes were 3.9% in NEC, 15.2% in Gambo Sawaba General Hospital, and 6.7% in AMA Foundation.

The Catquest-9SF score revealed improvement in patient satisfaction from baseline to eight weeks postoperatively in all the groups. This difference was statistically significant in all three facilities ($p=0.001$) between patient satisfaction at baseline and eight weeks post-operatively. The highest patient satisfaction was in the National Eye Centre, and the lowest was amongst patients of Gambo Sawaba General Hospital (Table 4).

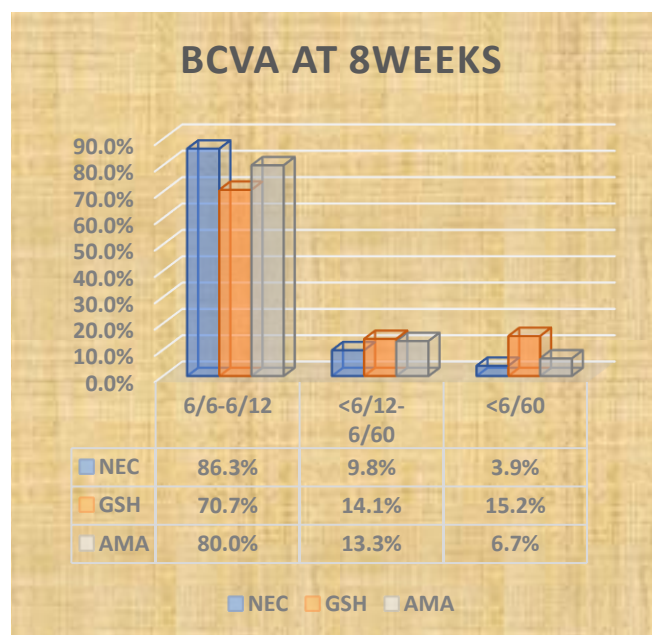


Figure 1. Comparison of BCVA outcomes at 8 weeks across the three facilities.

Table 4: Patient Satisfaction

Follow-up	Baseline	8weeks	t-Statistics	P=value
NEC	2.1378	3.9825	t (-20.627)	0.001
GSH	2.2708	3.9225	t (-21.452)	0.001
AMA	2.0287	3.9333	t (-14.963)	0.001

Discussion

The majority of the patients were within the age range of 61-80years with a mean range of 64.54±9.91years which is similar to the findings in Ibadan, Oyo State, Nigeria⁸ with a mean of 65.8±8.46 years and 66.1years at Onitsha by Nwosu *et al.*⁹ This age distribution is in conformity with what is seen in cataract patients in

Nigeria.⁶ About 81.20% of the patients were married, and only 18.80% were either divorced or widowed in this study, as is expected for this age range. It was found in this study that more than half (58.20%) of the patients did not have a formal education and 4.80% had no form of education while 36.90% had some level of formal education which is similar to a study by Olawoye *et al.*⁸ The predominant occupation of the patients was found to be farming and trading which correlates to the level of education of the patients and was similar to what was seen in other studies in parts of Nigeria.⁸

The pre-operative visual acuity was predominantly worse than 6/60, and since the patients were mostly illiterates, semi-illiterates, and farmers or traders, they only sought medical attention when they were blind or almost blind in the 2 eyes. Similar studies have reported such findings of pre-operative visual acuity in Nigeria, Africa, and India.^{8,10,11,12}

Visual outcome on the first postoperative day showed that 17 (33.3%) patients had good visual outcomes at the National Eye Centre, 24 (47.1%) had a borderline visual outcome, and only 10 (19.6%) had poor outcomes which were better than the first post-operative day visual outcome in Gambo Sawaba General Hospital who had a good outcome in 9 (9.1%), the borderline outcome in 64 (64.6%) and poor outcome in 26 (26.3%) while 3 (20%) had a good outcome in AMA Foundation, 8 (53.8%) had borderline outcome and 4 (26.7%) had a poor outcome. The first post-operative day visual outcome in the NEC and AMA foundation was found to be better than the first post-operative day in the study by Oladigbolu *et al.*¹⁰ The better visual outcome in this study can be attributed to the exclusion of patients with ocular co-morbidities like glaucoma, ARMD, diabetic retinopathy, etc. This is different from other studies worldwide, which have included patients with ocular comorbidities.^{8,10,13,15} Also, another contributing factor could be that most of the surgeries were small incision cataract surgery, which has less astigmatism, shorter healing time, and fewer complications. Another contributing factor could be the presence of biometry for patients in the National Eye Centre, even though this was absent in AMA and GSGH. The visual outcome of the patients from the National Eye Centre in this study at eight weeks was found to be comparable to the WHO visual outcome for cataract surgery and better than that of Olawoye *et al*, Adepoju *et al*, in Nigeria, and better than the study in Nepal.^{8,15,16}

The intra-operative complications noted were

posterior capsular rent with vitreous loss, striate keratopathy, corneal oedema, and cortical remnants. No case of endophthalmitis was noted in any of the facilities in this study, which is similar to studies conducted by Adepoju *et al*¹⁶ in Nigeria and Yorston *et al*¹¹ in Kenya, and contrary to other studies in Nigeria.^{8,10,17} This could be due to the rarity of this complication and the small sample size used, and also a possible high level of sterilization and good theatre management.

Patients in this study were followed up for eight weeks, which is the same duration as studies in Nigeria,^{8,10} and less than the one-year follow-up duration of other studies.^{11,16} All patients in Gambo Sawaba General Hospital and AMA Foundation had three or more post-operative visits, and just 1 (1.96%) person had two visits to the National Eye Centre; the rest had three or more visits. The number of post-operative visits conforms with the duration of the eight-week follow-up, as patients were seen at 1st post-op day, 1, 4, and 8 weeks respectively. In a study carried out in Sweden, two groups of cataract surgery patients for one year had either a planned or unplanned post-operative visit. Patients with second eye surgery and ocular comorbidity had planned post-operative visits while patients with uncomplicated surgery and with no comorbidities had no planned post-operative visits. There was no difference in postoperative outcomes between the two groups, and it was concluded that, without compromising patient safety, it is possible to reduce the burden of postoperative visits in cases with uncomplicated cataract surgery.¹⁸

Patient satisfaction with vision compared pre-operatively and post-operatively at eight weeks was statistically significant in all three facilities ($p=0.001$). This was highest for patients of the National Eye Centre (3.9825), followed by AMA Foundation (3.9333), and then Gambo Sawaba General Hospital. Patient satisfaction is an important clinical outcome because a satisfied patient is more likely to comply with treatments, attend follow-ups, and advocate for the service to others.¹⁹ A study in India comparing satisfaction amongst a governmental camp, a non-governmental camp, and a state medical college showed that 49% of the patients in the government camp were dissatisfied with their outcome, and 82% and 85% were satisfied with their visual outcome in the medical college and non-governmental camp, respectively.²⁰

Conclusion

Overall visual outcome was found to be good in all

three categories and was closely related to the figure advocated by WHO. Patient's satisfaction with the surgical outcome was also high.

It thus shows that with good patient selection, adequate pre-operative evaluation, and appropriate surgical techniques, a high level of good visual outcome and patient satisfaction is achievable in our environment.

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