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Research Article

# Visual Outcome after Cataract Surgery at the Sunyani Regional Hospital, Ghana

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## Abstract

**Aim:** A hospital based survey using secondary data was conducted with the aim of evaluating the visual outcome after cataract surgery at the Sunyani Regional Hospital.

**Methods:** This was a retrospective study and included individuals aged 50 years and above who had extracapsular cataract extraction (ECCE) in one or both eyes in 2013 and returned for outpatient appointments at the Sunyani Regional Hospital. The medical records of eighty-three (83) patients were retrieved and analysed using Statistical Package for social sciences (SPSS) version 23.

**Results:** There were 35 (42.2%) males and 48 (57.8%) females. The mean age (± SD) of the participants was 67.10 ± 10.62 years range = 41, 50 - 91 years. After 24 hours of cataract surgery, 7.23% had visual acuity of 6/18 or better, 55.42% had a visual acuity of 6/60 - 6/24 and 37.35% had a visual acuity worse than 6/60. After 1 month, 21.69% had visual acuity of 6/18 or better, 48.19% had a visual acuity of 6/60 - 6/24 and 30.12% had a visual acuity worse than 6/60. Further, 22.89% had visual acuity of 6/18 or better, 48.19% had a visual acuity of 6/60 - 6/24 and 28.92% had a visual acuity worse than 6/60 after three months. There was an association between age of cataract surgery and visual acuity outcome with ages 50 - 59 years recording better acuity compared to age 90 - 99 years ($p = 0.012$, 0.004 and 0.015 for 24 hours, 1 month and 3 months after surgery respectively). There was no record at the facility for post-operative refraction 1 month after the surgery. Cornea edema (18.07%) was the commonest cause of postoperative complication after 24 hours. After 3 months, only 4.8% had postoperative complication from causes such as misplaced IOL, cornea ulcer, posterior capsule opacification and endophthalmitis.

**Conclusion:** Though there was no relationship between comorbidity and the visual acuity outcome, it is worth operating on patients with other existing eye diseases to provide some vision to patients, and help in the management of the other existing disease (especially diseases of the retina). It is important to include refraction as one of the key procedures to perform after cataract surgery. Optometrists at facilities where cataract surgery is performed should be involved in preoperative and postoperative management of cataract patients.

***Keywords:*** *Cataract; Visual Outcome; Postoperative Complications; Pre- and Post- Operative Visual Acuity; Preexisting Ocular Morbidity; Ghana*

## Abbreviations

WHO: World Health Organization; ECCE: Extracapsular Cataract Extraction; CHRPE: Committee on Human Research, Publications and Ethics; KNUST: Kwame Nkrumah University of Science and Technology; KATH: Komfo Anokye Teaching Hospital; VA: Visual Acuity; GAP: Global Action Plan; NHIS: National Health Insurance Scheme; SICS: Small Incision Cataract Surgery

## Introduction

Cataract is the world's leading cause of blindness responsible for 51% of blindness and the second leading cause of visual impairment (33%) worldwide [1,2]. Development of opacity of the lens from any cause is known as cataract. A significant cataract presents when the transparency of the lens is reduced to the point that the patient's vision is impaired. It has been estimated that over 20 million people are blind from cataract in the world [2]. Majority of cataract blinded patients are found in developing countries where there is limited access to eye care. Furthermore, most of these cataract cases are age-related with the prevalence high among the aging population [3,4]. Cataract is treatable by surgery and manageable with optical correction. Surgery still remains the only treatment option. Cataract surgery plays a significant role in the restoration of vision and hope to patients. There is substantial improvement in visual acuity for most patients after cataract extraction across all age groups [5]. Every year, many more people become blind from cataract in both eyes with an estimated 53.9% of adults 40 years and above suffering from the condition in Ghana [6]. However, the total cataract operations done in Ghana takes care of only a quarter of the need. Studies in developing countries have shown visual outcomes of cataract surgery to be of concern [7-9].

The extraction of cataract has been an age long practice that has improved over the years. Inducement of astigmatism, which could lead to monocular diplopia, blur vision, glare, asthenopic complaints and visual aberrations, is a major problem encountered after cataract surgeries [10-12]. While there has been steady increase in cataract surgical rate and coverage (cataract output), there has not been a nationwide survey to monitor the visual outcome of cataract surgery in the country [13]. Good cataract outcome depends on the following; patient selection (comorbidity), surgery (surgical skills), spectacles (postsurgical refraction) and sequelae (late postoperative complications). Cataract outcome has largely been a neglected field of research in Ghana and other developing countries. National data on the visual outcome of cataract surgery is exiguous. Studies on the outcome of cataract surgery over the years have been limited to eye care services in the southern part of the country [8], resulting in limited data in other parts of the country. According to the World Health Organization (WHO), visual outcome can be assessed with best correction or with presenting visual acuity as follows: Good outcome (6/18 or better; presenting and best correction of > 85% and > 90% respectively), borderline outcome (6/60 - 6/24; presenting and best correction of 15% and < 5% respectively) and poor outcome (worse than 6/60; presenting and best correction of < 5% for both) [14]. This study sought to determine the visual outcome after cataract surgery at the Sunyani Regional Hospital in Ghana.

## Methods

This was a retrospective study limited to individuals aged 50 years and above who had extracapsular cataract extraction (ECCE) in 2013 at the Sunyani Regional Hospital in one or both eyes, and who returned for outpatient appointments. Patients excluded from the study were those who had surgery for traumatic cataracts, or who had other types of cataract surgery performed apart from ECCE. In all, 83 patients met the inclusion criteria.

Secondary data was collected over a 4 week period from 5$^{th}$ January to 5$^{th}$ February 2016. A simple recording form was developed to record the following: bio data, preoperative data including current prescription/refractive status, visual acuity, other existing ocular pathology in the operated eye. Postoperative data including visual acuity, prescription/refractive status 1 month after surgery, postoperative complications in operated eye after 24 hours and late postoperative complications in operated eye after 3months. Postoperative visual acuities were assessed based on the World Health Organization's classification. Data was entered and analyzed using SPSS- version 23.0 (Statistical Package for social sciences). A 95% confidence interval was calculated. P value less than 0.05 was considered as significant. Descriptive statistics was used to determine the visual acuity outcome after surgery as well as the age and gender distribution of the sample population.

Ethical approval was obtained from the Committee on Human Research, Publications and Ethics (CHRPE), Kwame Nkrumah University of Science and Technology (KNUST), School of Medical Science and Komfo Anokye Teaching Hospital (KATH). Permission to carry out the study was obtained from the Sunyani Regional Hospital. The study followed the tenets of the Declaration of Helsinki.

## Results

A total of 100 patients were operated on in the year 2013 at the Sunyani Regional Hospital; 83 met the inclusion criteria and were considered for the study. There were 35 (42.2%) males and 48 (57.8%) females. The mean age (± SD) of the participants was 67.10 ± 10.62 years (range = 41, 50 - 91 years). The mean age for males was 67.80 ± 10.31 years (range = 41, 50 - 91 years) and that of the females was 66.58 ± 10.92 years (range = 39, 50 - 89 years) (Table 1). The difference in age among males and females was not statistically significant (p = 0.61). The number of participants who had surgery on the Right Eye was 45 (54.2%), whereas 35 (42.2%) of participants had surgery on the Left Eye with the remaining 3 (3.6%) participants operated in both eyes.

| Age Group | Male | Female | Total |
|---|---|---|---|
| | N (%) | N (%) | N (%) |
| 50 - 59 years | 6 (7.2%) | 16 (19.3%) | 22 (26.5%) |
| 60 - 69 years | 16 (19.3%) | 10 (12.0%) | 26 (31.3%) |
| 70 - 79 years | 7 (8.4%) | 18 (21.7%) | 25 (30.1%) |
| 80 - 89 years | 5 (6.0%) | 4 (4.8%) | 9 (10.8%) |
| 90 - 99 years | 1 (1.2%) | 0 (0.0%) | 1 (1.2%) |
| Total | 35 (42.2%) | 48 (57.8%) | 83 (100.0%) |

***Table 1:*** *Age and Gender distribution of sample population.*

**Percentages are percentages of total sample population*

Out of the 83 patients, only 18 had other preexisting ocular conditions. Glaucoma was the highest followed by hypertensive retinopathy and age-related macular degeneration (Figure 1).

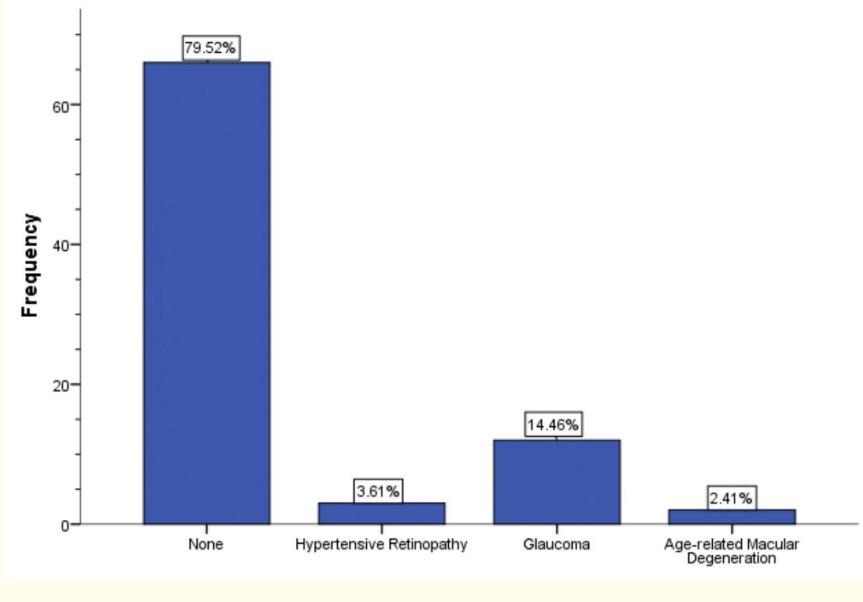


***Figure 1:*** *Preexisting ocular condition in the operated eye.*

Snellen visual acuities were taken at different times in the pre- and post-surgical management of the operated patients (Tables 2-5).

| Visual acuity | Number of eyes | Percentage (%) |
|---|---|---|
| Worse than 6/60 | 72 | 86.75 |
| 6/60 - 6/24 | 11 | 13.25 |
| Total | 83 | 100.00 |

***Table 2:*** *Preoperative visual acuity.*

| Age group | VA after 24 hours | | | Total |
|---|---|---|---|---|
| | Worse than 6/60 | 6/60-6/24 | 6/18 or better | |
| 50 - 59 years | 1 (4.55%) | 17 (77.27%) | 4(18.18%) | 22(100.00%) |
| 60 - 69 years | 12 (46.15%) | 10 (38.48%) | 4 (15.38%) | 26(100.00%) |
| 70 - 79 years | 11 (44.00%) | 11 (44.00%) | 3 (12.00%) | 25(100.00%) |
| 80 - 89 years | 7 (77.78%) | 1 (11.11%) | 1 (11.11%) | 9 (100.00%) |
| 90 - 99 years | 0 (0.00%) | 1 (100.00%) | 0 (0.00%) | 1(100.00%) |
| Total | 31 (37.35%) | 40 (48.19%) | 12 (14.46%) | 83(100.00%) |

***Table 3:*** *Classification of VA by age group 24 hours after the surgery.*

****Percentages shown are per row total*

| Age group | VA after 1 month | | | Total |
|---|---|---|---|---|
| | Worse than 6/60 | 6/60 - 6/24 | 6/18 or better | |
| 50 - 59 years | 2 (9.09%) | 10 (45.46%) | 10 (45.46%) | 22 (100.00%) |
| 60 - 69 years | 10 (38.46%) | 12 (46.15%) | 4 (15.38%) | 26 (100.00%) |
| 70 - 79 years | 7 (28.00%) | 15 (60.00%) | 3 (12.00%) | 25 (100.00%) |
| 80 - 89 years | 6 (66.67%) | 3 (33.33%) | 0 (0.00%) | 9 (100.00%) |
| 90 - 99 years | 0 (0.00%) | 0 (0.00%) | 1 (100.00%) | 1 (100.00%) |
| Total | 25 (30.12%) | 40 (48.19%) | 18 (21.69%) | 83 (100.00%) |

***Table 4:*** *Classification of VA by age group 1 month after surgery.*

****Percentages shown are per row total*

| Age group | VA after 3 months | | | Total |
|---|---|---|---|---|
| | Worse than 6/60 | 6/60-6/24 | 6/18 or better | |
| 50 - 59 years | 3 (13.64%) | 9 (40.91%) | 10 (45.45%) | 22 (100.00%) |
| 60 - 69 years | 8 (30.77%) | 13 (50.00%) | 5 (19.23%) | 26 (100.00%) |
| 70 - 79 years | 7 (28.00%) | 15 (60.00%) | 3 (12.00%) | 25 (100.00%) |
| 80 - 89 years | 6 (66.67%) | 3 (33.33%) | 0 (0.00%) | 9 (100.00%) |
| 90 - 99 years | 0 (0.00%) | 0 (0.00%) | 1 (100.00%) | 1 (100.00%) |
| Total | 24(28.92%) | 40 (48.19) | 19 (22.89%) | 83 (100.00%) |

***Table 5:*** *Classification of VA by age group 3 months after the surgery.*

****Percentages shown are per row total*

Sixteen (16) postoperative complications were recorded after 24 hours and 4 after 3 months. Each patient reported of having an ocular condition had only one of the ocular complication that were recorded (Table 6-10).

| Postoperative complications after 24 hours | Number | Percentage |
|---|---|---|
| None | 67 | 80.72% |
| Cornea oedema/Striate keratopathy | 15 | 18.07% |
| Ruptured zonules | 1 | 1.20% |

***Table 6:*** *Early Postoperative complications.*

| Postoperative complications after 3 months | Number | Percentage |
|---|---|---|
| None | 79 | 95.18% |
| Misplaced lens | 1 | 1.20% |
| Cornea ulcer | 1 | 1.20% |
| Posterior capsule opacification | 1 | 1.20% |
| Endophthalmitis | 1 | 1.20% |

***Table 7:*** *Late Postoperative complications.*

| | VA after 24 hours | | | Total |
|---|---|---|---|---|
| | Worse than 6/60 | 6/60-6/24 | 6/18 or better | |
| No existing ocular pathology in the operated eye | 21 (32.31%) | 33 (50.77%) | 11 (16.92%) | 65 (100.00%) |
| Existing ocular pathology in the operated | 10 (55.56%) | 7 (38.89%) | 1 (5.56%) | 18 (100.00%) |
| Total | 31 (37.35%) | 40 (48.92%) | 12 (14.46%) | 83 (100.00%) |

***Table 8:*** *Classification of postoperative VA by existing ocular disease after 24 hours.*

****Percentages shown are per row total*

| | VA after 1 month | | | Total |
|---|---|---|---|---|
| | Worse than 6/60 | 6/60-6/24 | 6/18 or better | |
| No existing ocular pathology in the operated eye | 17 (26.15%) | 30 (46.15%) | 18 (27.69%) | 65 (100.00%) |
| Existing ocular pathology in the operated eye | 8 (44.44%) | 10 (55.56%) | 0 (0.00%) | 18 (100.00%) |
| Total | 25 (30.12%) | 40 (48.19%) | 18 (21.69%) | 83(100.00%) |

***Table 9:*** *Classification of postoperative VA by existing ocular disease after 1 month.*

****Percentages shown are per row total*

| | VA after 3 months | | | Total |
|---|---|---|---|---|
| | worse than 6/60 | 6/60-6/24 | 6/18 or better | |
| No existing ocular pathology in the operated eye | 16 (24.61%) | 31 (47.69%) | 18 (27.69%) | 65 (100.00%) |
| Existing ocular pathology in the operated eye | 8 (44.44%) | 9 (50.00%) | 1 (5.56%) | 18 (100.00% |
| Total | 24 (28.92%) | 40 (48.19%) | 19 (35.85%) | 83 (100.00%) |

***Table 10:*** *Classification of postoperative VA by existing ocular disease after 3 month.*

****Percentages shown are per row total*

## Discussion

One of the goals of Vision 2020 and the Global Action Plan (GAP 2013-2019) is to ensure equitable access to eye health amongst men and women as a result of the limited access to healthcare by women. Since a higher proportion of women are blind globally compared to men especially from cataract, it is expected that the number of women undergoing cataract surgery must exceed that of men. This study revealed that cataract surgery was considerably higher in women than in men, that is 57.8% women as compared to 42.8% men. Similar findings were also observed in the study by Hashmi [15] in Pakistan in which the overall rate was 58% in women as against 42% men [15]. However this trend was different from observations made by Lewallen [16] in which it was stated that, cataract could be reduced by around 11% in the low- and middle-income countries if women were to receive cataract surgery at the same rate as men. The reason why the number of women that underwent the cataract surgery were more than men in this study was not clear but could be due to the fact that many women in the region have equal access to health care as a result of the use of the National Health Insurance Scheme (NHIS) without any religious or cultural barriers.

The percentage of patients with visual acuity ≥ 6/18 improved from 14.46% after 24 hours to 21.69% after 1 month then 22.89% after 3 months. A similar research conducted in Ghana by Ilechie., *et al*. [8] evaluated 48 hours and 4 - 6 weeks after surgery. Their research revealed that there was increase in the number of patients with Good visual acuity from 283 (22%) after 48 hours to 522 (41%) at 4 - 6 weeks follow up. The greater improvement in visual acuity in their study could be attributed to the fact that their study was conducted in Tertiary hospitals with more advanced facilities and surgical expertise; their study included patients who had undergone Small Incision Cataract Surgery (SICS) and ECCE. In our study only patients who had undergone ECCE were considered because that was the main surgical procedure undertaken at the hospital. In spite of the different approaches taken for these studies, a trend towards improvement of visual acuity with time is not in doubt.

Furthermore, the results after 3 months was similar to those found among rural Chinese populations in Shunyi and Doumen, and at the Orakzai agency in Pakistan. The percentage of operated eyes with presenting visual acuity of 6/18 or better was 25.0% and 23.7%, in Shunyi [17] and Doumen [18] respectively but was better than 5.5% at the Orakzai agency [7].

Visual acuities after 3 months were used because of the fact that, after three months, vision had become stable and most complications had been managed by then. Though there were improvements in the visual outcome after three months, it was not up to the WHO recommendation. WHO recommends that after cataract surgery, more than 80% of patients should obtain a visual acuity (presenting or best-corrected) of > 6/18. This study might not have met the above recommendation from WHO because there were no records at the hospital for refractive correction 1 month after the surgery. Refraction was not usually performed after 1 month because of the fact that patients appreciated slight improvement in vision after the surgery. Another reason was that patients were charged pro-rata for the cataract surgery which might have been expensive for some patients, and therefore could not afford spectacles to improve their vision. Further, optometrists at the hospital were not involved in cataract postoperative review. Since optometrists are trained in correcting refractive errors, their involvement in postoperative review would have helped in achieving better visual outcome after the surgery.

The surgical complications after 24 hours were comparable to a study by Ahmed, Shoaib, Fayyaz., *et al*. [19] in Sudan. In their study, the most frequent complication after the 24 hours was striate keratopathy (5.68%) followed by anterior uveitis (3.55%) [19]. The reason for more surgical complications, that is, anterior uveitis after 24 hours was not clear but could be attributed to the skills of the surgeon. Although cornea oedema was the highest complication after 24 hours, it resolved after one week postoperative follow up. The smaller percentage of postoperative complications after three months could be attributed to patient compliance to postoperative instructions and postoperative follow up. Ilechie., *et al*. [8] in their research also reported that the most common early postoperative complication was corneal edema and second most common being hyphema. However, posterior capsular opacification was the most common late postoperative complication.

There was an association between the visual acuity outcome and the age at which cataract surgery was performed, with ages 50 - 59 years recording better acuity and 90 - 99 years recording the worse visual acuity (p = 0.012, 0.004, 0.015 after 24 hours, 1 month, and 3 months post operation respectively).This shows that performing cataract surgery at an earlier age may result in a better visual acuity compared to performing the surgery at a later age; older patients are more likely to suffer from other co-morbidities that may affect their visual acuity. This finding is consistent with that of Desai, Minassian, and Reidy [20] which showed that the younger a person is, the more likely he/she will achieve better visual outcome after the surgery. They also stated that older age groups (90 years and above) have four times higher risk of poor visual outcome compared with the younger groups (50 - 59 years) [20]. In the long term (after 3 months), only eight patients with preexisting ocular morbidity has visual acuity worse than 6/60 after cataract surgery. The study could not establish any association between comorbidity and visual acuity outcome after cataract surgery (p = 0.10). This may be due to glaucoma being the highest comorbidity found in the study; perhaps the glaucoma may not have been advanced to affect the central vision. Though other ocular morbidity especially retinal/optic nerve diseases may result in poor prognosis after surgery, it is worth operating on patients with other existing eye diseases to provide some vision to patients, and help in the management of the other existing disease (especially diseases of the retina).

## Conclusion

In order to improve cataract surgical outcome, it is important to include refraction as one of the key procedures to perform at the hospital after cataract surgery. Optometrists at eye care facilities in Ghana where cataract surgery is performed should be involved in preoperative and postoperative management of cataract patients.

## Conflict of Interest

There is no conflict of interest.

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