

## ORIGINAL ARTICLE

### ASSESSMENT OF OUTCOME IN PATIENTS UNDERGOING CATARACT SURGERY: AN INSTITUTIONAL BASED STUDY

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#### ABSTRACT:

**Background:** Cataract is the major cause of blindness and of severe visual impairment in many developing countries, leading to bilateral blindness in an estimated 20 million people worldwide. Increasing age is associated with an increasing prevalence of cataract. The main objective of the present study is to assess the outcome in patients undergoing cataract surgery. This is an institutional based study. **Materials and methods:** The study was conducted in the Department of Ophthalmology in the Institution. All the cases selected were aged 40 years and above. All the selected cases were studied thoroughly and details before and after the surgery were recorded. Patients that had surgery for traumatic cataracts were excluded from the study. Data of each patient was collected including age, gender, level of education (literate or illiterate), uncorrected and corrected distance visual acuity (UDV and CDVA) at presentation following up after one week of surgery and finally after 6 to 8wk of surgery, pre-existing eye disease, the preoperative, intra-operative, and postoperative findings and complications. **Results:** A total of 134 eyes in 120 patients were admitted with cataract surgery during the study period time. In 132 patients with cataract, the average age was 64.12 ±12 years with a range of 40-89 years. The number of patients was equal in male and female patients. In 60 eyes the right eye was operated, in 74 eyes the left eye was operated. Among 120 patients, 42 patients were literate and 90 patients were illiterate. Illiterate predominance significantly occurred in a range of 70-79y. Female had significantly higher rates of illiterate compared to male ( $X^2=10.3$ ,  $P=0.001$ ).

**Conclusion:** In summary, we reported the postoperative outcomes of cataract surgery. These surgeries were done with MSICS, a cost-effective procedure without phacoemulsification machine or sutures. It provides a good visual recovery in our samples but the vision outcome did not fulfill the standards proposed by WHO, which highlights the need for local socioeconomic understanding, population education for raising awareness about ocular illnesses, thorough preoperative assessment, standardizes training of surgical technique, supply of higher quality operating microscopes and IOLs, postoperative monitoring and very importantly audit of outcomes to ensure the highest possible quality of surgical service.

**Keywords:** Cataract, Operative complications, Visual outcome

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#### INTRODUCTION:

Cataract is the major cause of blindness and of severe visual impairment in many developing countries, leading to bilateral blindness in an estimated 20 million people worldwide. Increasing age is associated with an increasing prevalence of cataract.<sup>1, 2</sup> As Indian population ages, cataract-induced visual dysfunction and blindness is on the increase. Cataract surgery is the only way to cure these patients with cataract and restore their vision. So, the demographic changes will lead to a doubling in the need for cataract.<sup>3</sup> The performance of cataract intervention programmes is assessed by the number of cataract operations conducted each year. In India, this number has increased from 1.2 million in 1989 to 2.7 million in 1996 (Central Ophthalmic Cell, Directorate General Health Services, Government of India, unpublished data, 1997). The crude cataract surgical rate (CSR) can be estimated using the total population as denominator; age-specific rates can also be calculated if population and surgery data are available for defined age groups.<sup>4</sup> For India, the CSR in 1996 was approximately 2800 per million of the total

population. Results from several population-based studies conducted show the visual outcome faced difficulties to meet the standards proposed by the World Health Organization (WHO) (more than 85% of operated eyes should have >6/18 vision at six weeks following cataract surgery).<sup>5-7</sup> Cataract surgery aims to rehabilitate blind or visually impaired persons by restoring their eyesight so that their quality of life and ability to function are returned to normal or as near normal as possible. The outcome of cataract surgery for an individual or for a defined population is therefore as important as measuring the quantity of surgical operations performed. Outcome can be measured simply as the visual acuity in the operated eye or in the patient, and also in terms of ability to function, quality of life and economic rehabilitation.<sup>8-10</sup> The main objective of the present study is to assess the outcome in patients undergoing cataract surgery. This is an institutional based study.

#### MATERIALS AND METHODS:

The study was conducted in the Department of Ophthalmology in the institution. The ethical approval for conducting the study was obtained from the ethical

committee of the institute. The subjects selected for the study had cataract as the main cause for their blindness. All the cases selected were aged 40 years and above. All the selected cases were studied thoroughly and details before and after the surgery were recorded. Patients that had surgery for traumatic cataracts were excluded from the study. Data of each patient was collected including age, gender, level of education (literate or illiterate), uncorrected and corrected distance visual acuity (UDV and CDVA) at presentation following up after one week of surgery and finally after 6 to 8wk of surgery, pre-existing eye disease, the preoperative, intra-operative, and postoperative findings and complications. The detailed examination included evaluation by instrumentation including slit lamp microscopy, ophthalmotonometer, gonioscopy, direct as well as indirect ophthalmoscopy, ultrasound (A+B) scan. The degree of lens opacity was graded after mydriasis with anterior segment slit-lamp and divided into cortical, nuclear, and posterior subcapsular opacities according to the Lens Opacities Classification System II (LOCS II).<sup>11</sup> The vision was tested with the help of Snellen's distant vision chart and the visual gain was measured using the WHO recommended method of using postoperative visual status at 6 to 8wk postoperatively.<sup>12</sup> Age of the patients was classified as 40-49, 50-59, 60-69, 70-79, 80 and above years. The statistical analysis of the data was done using SPSS software for the windows. Mean, standard deviation, ratios and proportions were

calculated. The statistical level of significance was determined at  $p < 0.05$ .

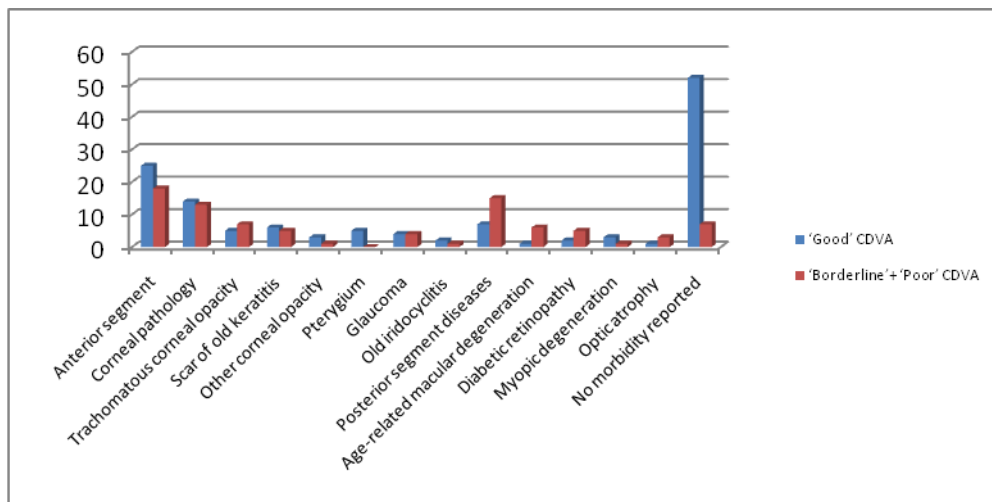
**RESULTS:**

A total of 134 eyes in 120 patients were admitted with cataract surgery during the study period time. The profile of the examined sample is given in Table 1. In 132 patients with cataract, the average age was  $64.12 \pm 12$  years with a range of 40-89 years. The number of patients was equal in male and female patients. In 60 eyes the right eye was operated, in 74 eyes the left eye was operated. Among 120 patients, 42 patients were literate and 90 patients were illiterate. Illiterate predominance significantly occurred in a range of 70-79y. Female had significantly higher rates of illiterate compared to male ( $X^2=10.3, P=0.001$ ).

Cataracts were classified as follows according to LOCS II: 1) nuclear cataract, significant nuclear opacities or colors; 2) cortical cataract, significant cortical opacities; 3) posterior subcapsular cataract, significant posterior subcapsular opacities (3% above of the posterior capsule). In our study, 77 eyes had the "nuclear cataract" type of cataract, 20 eyes had the "cortical cataract" type of cataract, and 14 eyes had the "posterior subcapsule cataract" type of cataract (Table 1). The presence of co-morbidities were noted prior to surgery and was also evaluated (Table 2). The most common co-morbidity was corneal pathology (Figure 1). Other co-morbidities included glaucoma, old iridocyclitis, pterygium, age-related macular degeneration *etc.*

**Table 1:** Profile of the patient operated for cataract

| Age , n      | Gender         | Literate       | Illiterate     | Nuclear cataract | Cortical cataract | Posterior subcapsule cataract | Pseudophakia   | Aphakia      |
|--------------|----------------|----------------|----------------|------------------|-------------------|-------------------------------|----------------|--------------|
| 40-49, 6     | 1 : 1          | 1 : 1          | 0 : 0          | 0 : 0            | 0 : 0             | 1 : 1                         | 1 : 1          | 0 : 0        |
| 50-59, 17    | 8 : 7          | 8 : 6          | 1 : 2          | 0 : 1            |                   | 3 : 4                         | 6 : 2          | 3 : 1        |
| 60-69, 28    | 9 : 13         | 6 : 2          | 14 : 21        | 17 : 14          | 3 : 5             | 2 : 0                         | 18 : 20        | 3 : 1        |
| 70-79, 58    | 22 : 24        | 8 : 2          | 16 : 23        | 18 : 14          | 5 : 7             | 2 : 1                         | 18 : 21        | 2 : 0        |
| ≥80, 25      | 8 : 5          | 6 : 1          | 4 : 9          | 7 : 6            | 0 : 0             | 0 : 0                         | 7 : 5          | 0 : 0        |
| <b>Total</b> | <b>48 : 50</b> | <b>29 : 13</b> | <b>35 : 55</b> | <b>42 : 35</b>   | <b>8 : 12</b>     | <b>8 : 6</b>                  | <b>50 : 49</b> | <b>8 : 2</b> |



**Figure 1:** Effect of pre-operative ocular co- morbidity on visual outcome 6-8 weeks after surgery

**Table 2:** Effect of pre-operative ocular co- morbidities on visual outcome 6-8 weeks after surgery

| Co-morbidity                      | 'Good' CDVA      | 'Borderline'+ 'Poor' CDVA |
|-----------------------------------|------------------|---------------------------|
| <b>Anterior segment</b>           | <b>25 (19.5)</b> | <b>18 (12.8)</b>          |
| Corneal pathology                 | 14               | 13                        |
| Trachomatous corneal opacity      | 5                | 7                         |
| Scar of old keratitis             | 6                | 5                         |
| Other corneal opacity             | 3                | 1                         |
| Pterygium                         | 5                | 0                         |
| Glaucoma                          | 4                | 4                         |
| Old iridocyclitis                 | 2                | 1                         |
| <b>Posterior segment diseases</b> | <b>7 (4.2)</b>   | <b>15 (14.2)</b>          |
| Age-related macular degeneration  | 1                | 6                         |
| Diabetic retinopathy              | 2                | 5                         |
| Myopic degeneration               | 3                | 1                         |
| Optic atrophy                     | 1                | 3                         |
| No morbidity reported             | 52 (49.6)        | 7 (5.8)                   |
| <b>Total</b>                      | <b>94 (73.2)</b> | <b>40 (32.8)</b>          |

p-value &lt; 0.05 (Significant)

**DISCUSSION**

In our study, it was interesting to note that there were high rate of illiteracy in elderly population, especially older women. In this area, many old people, especially elderly females, who mostly had no choice to attend school when they were young, have to leave to stay home since their children or husband work outside. They, named as empty nest seniors, mostly have to dependent on outdoor agrarian activities to provide for themselves and their grandchildren, thus are enforced to accept more exposure ultraviolet-B (UV-B), this is considered as a risk factor of cataract development.<sup>13, 14</sup> The cumulative effect, including age, exposure of UV-B, high prevalence of diabetes, and so on, finally results in overspeed development of cataract, like the mature or hypermature cataract as we have seen in this study.<sup>15</sup> Thus, it reasonable to suspect that the higher burden in old women with illiterate is due, at least in part, to a greater risk of cataract development.

One of the notable findings of this work was the number of ocular co-morbidity before cataract extraction. In our study, 27 of 134 eyes with corneal pathology have 13 eyes of 'borderline' + 'poor' CDVA after surgery, which showed that corneal pathology was the most common cause of visual impairment and blindness. It is a matter of concern and the reasons are as follows: firstly, trachoma could be infected, especially in elderly people because of their bad hygienic habits; Secondly, it has higher rates of pneumonia (such as tuberculosis, chronic obstructive pulmonary disease etc.) and diabetes where local people often have to suffer from cold wet climate in autumn and winter, which are main causes for them easily infected by virus;<sup>16</sup> Thirdly, it is a documented fact the people often ignore minor corneal trauma during agricultural work or in

the home so that microbial keratitis develops following a corneal ulcer or severe corneal scarring. Except for corneal opacity, glaucoma and age-related macular degeneration were also the common co-morbidities before surgery easily ignored by local people, especially those illiterate patients, and also were the common cause of poor CDVA after cataract surgery. These two co-morbidities and other post segment diseases such as diabetic retinopathy, myopic degeneration and optic atrophy were often not examined by ophthalmologists because of mature and hypermature cataract. In spite of this, it is often worth operating on eyes in order to improve the vision field by cataract extraction. Certainly, as life expectancies increase, the influence of coexisting ocular pathologies on visual outcomes will become more marked, highlighting the importance of a thorough preoperative assessment that includes a dilated posterior segment examination and a thorough comprehension by the patient who have a desire and necessity of surgery before cataract extraction.<sup>10</sup> Our result achieved acceptable UDVA and CDVA postoperatively, showing it was cost-effective for visual rehabilitation. In our study, Iris prolapse was the most frequent intraoperative complication because of the hydrostatic pressure during nuclear removal, which probably occurred when the procedures were done in operation, that is, one was a deep scleral tunnel incision, second was an early perforation into the anterior chamber of the wound. Mönestam E et al. conducted a study to compare the long-term longitudinal visual acuity outcomes after cataract surgery in eyes with age-related macular degeneration (AMD) at surgery and eyes without comorbidity. It was a longitudinal cohort study. Patients having cataract surgery were evaluated over 1 year. A clinical eye examination and

corrected distance visual acuity (CDVA) measurement were performed preoperatively and postoperatively as well as 5 and 10 years postoperatively for eligible patients. The patients were divided into functional groups depending on postoperative signs of macular degeneration and postoperative CDVA. The study evaluated 810 patients. The rate of CDVA decline with age was faster in AMD patients than in patients without comorbidity. The slope of the visual acuity decline was similar in the 2 subgroups with AMD (almost normal CDVA and reduced CDVA postoperatively). After adjustment for age, there was a mean loss of 2.3 logMAR letters in patients with no comorbidity and 6.4 letters in patients with AMD at surgery for each decade of increasing age. More than 75% of AMD patients had better CDVA 10 years after surgery than before surgery. Patients with signs of AMD at cataract surgery had a longitudinally worse visual outcome than patients without clinical signs of AMD. However, there is no reason to discourage patients with concurrent visually significant cataract and AMD from having surgery because most AMD patients had better CDVA 10 years after surgery than before surgery.<sup>16</sup> Bourne et al conducted study to evaluate the outcome of cataract surgery in the population of Bangladesh. Data were collected by the National Blindness and Low Vision Prevalence Survey of Bangladesh, a cross sectional, nationally representative sample (12 782 subjects) of the population aged  $\geq 30$  years. An interview recorded socioeconomic data. Each subject was tested for logMAR visual acuity (VA) of each eye, autorefracted, and then underwent optic disc examination. Those with  $< 6/12$  VA on presentation in either eye were retested with their refractive correction, dilated, and examined for anterior and posterior segment disease. In aphakic and pseudophakic subjects the date, location and operating conditions (eye camp/hospital), and type of operation(s) were recorded. 11 624 eligible subjects were examined (90.9% response rate) in the survey. 162 subjects, 77 men and 85 women, had undergone cataract surgery in one or both eyes. 199 (88%) eyes had undergone intracapsular cataract extraction (ICCE), and 22 (10%) extracapsular surgery with intraocular lens (ECCE+IOL); surgical technique(s) in four cases were not identified. No significant association was found between time since surgery and VA outcome, nor was there a sex difference for postoperative vision. Literate subjects were significantly less likely to have an outcome of  $< 6/18$  (OR: 2.38,  $p < 0.01$ ) or  $< 6/60$  (OR: 2.87,  $p < 0.01$ ). Following ICCE (199 eyes), 56 (37%) of the 151 eyes with an aphakic spectacle correction achieved 6/12 or better. Females, eye camp surgeries, illiterate subjects, and rural dwellers were less likely to wear their aphakic correction. The ratio of ICCE:ECCE+IOL has reduced in the past 3 years (3.8:1) compared to  $\geq 4$  years before the survey (25:1). Hospital based ECCE+IOL surgeries were associated with a better outcome, yet 36% of these eyes were  $< 6/12$  postoperatively, after excluding coincident disease. This

evaluative research study into cataract surgery outcomes in Bangladesh highlights the need for an improvement in quality and increased quantity of surgery with a more balanced distribution of services.<sup>17</sup> Yoon Jung Choi et al. identified the degree of the appropriate rating surgery associated with the outcome changes in postoperative 12 months. The patients in this study were followed up prospectively in preoperative and postoperative 12 months periods. The 20 ophthalmologists in 14 hospitals were asked to refer about 20 patients who were scheduled to undergo cataract surgery from March and June of 1997. There was a trend that the appropriate rating surgeries were related to the successful change of the vision function (2.29,  $p = 0.015$ ) and satisfaction with vision (3.84,  $p = 0.014$ ) in 12 month postoperative period. The crucial or appropriate rating surgeries may indicate better outcomes than uncertain or inappropriate rating surgeries do. The appropriate rating surgeries were more closely related to functional outcome vision function, VF-14 and subjective outcome (satisfaction with vision) in postoperative 12 months than inappropriate rating surgeries.<sup>18</sup>

#### CONCLUSION:

In summary, we reported the postoperative outcomes of cataract surgery. These surgeries were done with MSICS, a cost-effective procedure without phacoemulsification machine or sutures. It provides a good visual recovery in our samples but the vision outcome did not fulfill the standards proposed by WHO, which highlights the need for local socioeconomic understanding, population education for raising awareness about ocular illnesses, thorough preoperative assessment, standardizes training of surgical technique, supply of higher quality operating microscopes and IOLs, postoperative monitoring and very importantly audit of outcomes to ensure the highest possible quality of surgical service.

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