EVALUATION OF VISUAL OUTCOME OF CATARACT SURGERY IN EYE CAMPS
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ABSTRACT

BACKGROUND
According to various surveys, cataract is the most common cause of blindness in India. India has the world’s largest cataract backlog. The treatment for cataract is surgical, a highly cost-effective intervention with excellent prognosis for sight restoration. In a country like India where majority of the population resides in rural areas, community-oriented approach including the base hospital surgery and peripheral eye camp approach can be effectively utilised to tackle the backlog of cataract blindness.

The aim of the study is to evaluate the outcome of cataract surgery performed in outreach eye camps in northern India.

MATERIALS AND METHODS
The preoperative and postoperative visual acuity and surgical complications were evaluated retrospectively in 1486 patients who underwent cataract extraction in eye camps held in northern India over a period of one year.

RESULTS
Of 1486 patients, 827 (55.6%) patients were operated in the peripheral surgical camp and 659 (44.3%) were brought to the base hospital for surgery. At follow up, 65.3% patient had BCVA better than 6/18 in the operated eye compared to 0.5% preoperatively and the difference was significant (p<0.0001). 93.3% of the patients operated by phacoemulsification and 91.2% of the patients who underwent manual Small Incision Cataract Surgery (SICS) had regained visual acuity of 6/18 or better at 6 weeks follow up. Most common complication was corneal oedema seen in 3.3% patients.

CONCLUSION
It’s possible to obtain acceptable results from cataract extraction in well conducted eye camps.

KEYWORDS
Cataract Surgery, Visual Outcome and Eye Camps.


BACKGROUND
Cataract still remains the major cause of blindness despite increased availability of cataract surgical services.1-3 The estimates from WHO reveal that 47.8% of global blindness is due to cataract and in South Asia region, which includes India, 51% of blindness is due to cataract.4 According to National Programme for Control of Blindness, which was launched in the year 1976 as a 100% centrally sponsored scheme with the goal to reduce the prevalence of blindness from 1.4% to 0.3% states that cause of blindness because of cataract in India is as high as 62%.5 Also, a combined survey done by WHO-NPCB from 1986-1989 concluded that major cause of blindness in India is cataract about 80.1%.6 The treatment for cataract is surgical, a highly cost-effective intervention with excellent prognosis for sight restoration. There has been an international drive (Vision 2020- the Right to Sight) to increase cataract surgical services in order to reduce the cataract “backlog”.7 The world’s largest cataract backlog with approximately 7 million individuals in need of cataract surgery.8 The reasons for this backlog include lack of access to eye care and lack of resources, specially-trained surgeons to deliver cataract surgery safely and reliably.

Efforts to provide effective services have had limited success in reaching the cataract blind population either due to geographical barrier or financial constraints. In a country like India where majority of the population resides in rural areas, community-oriented approach including the base hospital surgery and peripheral eye camp approach can be effectively utilised to tackle the backlog of cataract blindness.9 However, there have been increasing concerns about the complications and visual outcome of cataract surgery in outreach camps. This retrospective study was
designed to evaluate the visual outcome of cataract surgeries performed in eye camps over a period of one year.

**MATERIALS AND METHODS**

In this retrospective study, records of all patients who underwent cataract surgery in the outreach camps during the past one year were reviewed. All patients underwent surgery either by the base hospital surgery approach or the peripheral outstation surgical camp approach. In the latter situation, clinic was held for 1-2 days in the rural setup followed by surgery in the local civil hospital under standardised strict sterilisation conditions.

Preoperative evaluation included Visual Acuity (VA), slit lamp biomicroscopy, ophthalmoscopy and tonometry. Blood pressure and blood sugar were checked for all patients. IOL power calculation was done with a handheld automated keratometer and A-scan.

All surgeries were performed under peribulbar anaesthesia. Type of surgeries performed included manual Small Incision Cataract Surgery (SICS), phacoemulsification, Extracapsular Cataract Extraction (ECCE) and ICCE (for subluxated lens). Postoperative visual acuity assessment was carried out and patients were examined with slit lamp on the first post op day; complications if any were recorded. Patients were discharged on 3rd and 4th postoperative day. Follow up was conducted after 4-6 weeks of surgery and the BCVA was determined. WHO classification of blindness[^10^] (best corrected visual acuity in better eye) was used to categorise the patients (Table 1).

### Table 1. WHO Classification of Blindness[^2^]

<table>
<thead>
<tr>
<th>Visual Acuity</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/6-6/18</td>
<td>Normal</td>
</tr>
<tr>
<td>&lt;6/18-6/60</td>
<td>Visual impairment</td>
</tr>
<tr>
<td>&lt;6/60-3/60</td>
<td>Severe visual impairment</td>
</tr>
<tr>
<td>&lt;3/60-NPL</td>
<td>Blind</td>
</tr>
</tbody>
</table>

[^10^]: *Best corrected visual acuity in the better eye.

**Results and Analysis**

A total of 1486 patients were included in the study, out of which, 827 (55.6%) patients were operated in the peripheral surgical camp and 659 (44.3%) were operated in the base hospital (Figure 1). A total number, 629 (46.18%) patients had a mature cataract and 147 (10%) had bilateral cataract.

**Age and Gender Distribution**

Out of the 1486 patients enrolled in this study 761 (51.2%) were males and 726 (48.8%) were females (Figure 2). The age of the patients ranged from 45-89 years with maximum number of patients (40.8%) between 61-70 years (Figure 3).

### Table 2. Preoperative and Postoperative Visual Acuity of Operated Eye at Follow-Up (4 Weeks)

<table>
<thead>
<tr>
<th>Visual Acuity</th>
<th>PreopFrequency</th>
<th>Percent</th>
<th>PostopFrequency</th>
<th>Percent</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6/6-6/18)</td>
<td>7</td>
<td>0.5%</td>
<td>971</td>
<td>65.3%</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>(&lt;6/18-6/60)</td>
<td>69</td>
<td>4.6%</td>
<td>437</td>
<td>29.4%</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>(&lt;6/60-3/60)</td>
<td>274</td>
<td>18.4%</td>
<td>29</td>
<td>2.0%</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>(&lt;3/60-NPL)</td>
<td>1137</td>
<td>76.5%</td>
<td>50</td>
<td>3.4%</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>

[^2^]: On comparing the visual outcome based on the type of surgery performed, it was observed that 93.3% of the patients operated by phacoemulsification had regained visual acuity of 6/18 or better and 91.2% of the patients who underwent manual SICS had also regained vision of 6/18 or better at 4 weeks follow-up. The difference was not statistically significant. It was also observed that preoperatively 76.5% patients had Best Corrected Visual Acuity (BCVA) of <3/60 in the operated eye and after cataract surgery, only 11.5% eyes had Uncorrected Visual Acuity (UCVA) of <3/60 at the time of discharge, i.e. 4th postoperative day and this difference was statistically significant (p<0.001). The most common cause of low vision was corneal oedema. At follow up, 65.3% patients had BCVA better than 6/18 in the operated eye compared to 0.5% preoperatively and the difference was statistically significant (p<0.0001) (Table 2, Figure 5). There were only 4.3% operated eyes who had vision less than 3/60 even at follow up (6 weeks) and the cause of low vision in these eyes was mainly pre-existing corneal pathologies like corneal degeneration or posterior segment pathologies like age-related macular degeneration.

**Complications**

Vitreous loss following posterior capsular rupture was the most common intraoperative complication seen in 24 (1.6%) patients. In the early postoperative period, corneal oedema was the commonest complication seen in 3.3% patients.
DISCUSSION

Cataract is a significant and increasing global problem. The vast majority of cataract patients in developing countries live in rural areas, while hospitals and surgical facilities are more clustered in the cities and larger towns.\(^1\),\(^3\),\(^11\) In practice generally, these facilities are accessible only to people living in their immediate vicinity. Various studies have noted that people readily do not accept eye care surgeries when offered free of cost. The common problems for cataract surgeries encountered were attitudinal barriers related to service delivery, cost and affordability.\(^12\) Given the high backlog of cataract blind and the level of incidence, there is an urgent need to move beyond the debate of whether high quality can be achieved in high volumes. Since there are no preventive measures to stop cataract formation, the only way to solve the increasing backlog of cataract blindness is to do a significantly higher volume of cataract surgeries.

With proper organisation and the right attitude, it is not only possible to achieve high volume and high quality, but it is something that has to be done immediately in face of the rising backlog of cataract blindness. There are various strategies for increasing the number of cataract surgeries in developing countries. One of the accepted ways to increase uptake of cataract services is by extending ophthalmic care facilities to the rural areas through mobile eye units, thereby providing cataract surgical services close to where the majority of the people live. Base hospital surgery approach is preferred to peripheral surgical camps and in the last 2 years or so we have shifted to a total base hospital surgical approach.\(^5\) Good visual outcome is achievable in outreach eye camp under standard conditions.\(^13\) Over the past decade, manual Small Incision Cataract Surgery (SICS) has become an established surgical alternative to phacoemulsification. Phacoemulsification is the preferred technique in the developed world and tertiary centers of developing countries.\(^14\) The advantage of both techniques are sutureless, require small incisions and result in faster visual rehabilitation. Phacoemulsification requires a much smaller incision (3.2 mm) than SICS, but the incision size dependent on the type of phacoemulsification machine being used. In manual SICS, the entire crystalline lens is removed through a self-sealing scleral tunnel incision (5-7 mm) and a rigid polymethyl methacrylate intraocular lens implanted.

In this study, as results of manual SICS were comparable with those of phacoemulsification, the former technique is preferred in eye camp settings as small incision cataract surgery was almost half the cost of phacoemulsification with easier learning curves. The duration of surgery was also lower. Hence, a surgeon using SICS would more productive if there is a backlog of cataract patients. Thus, implying the continuous need of extending quality eye care service to the underserved rural population through standardised outreach programs.
CONCLUSION
This evaluation suggests that it is possible to obtain acceptable results from cataract extraction with experienced ophthalmologists in well-conducted Indian eye camps. As evident from the output of surgery, mobile eye units have a role to reduce the backlog of cataract blindness especially in rural areas where there is a perpetual shortage of treatment facilities and medical personnel.

REFERENCES