



## PHACOEMULSIFICATION; OUTCOME WITH LOW COST RIGID IOL IN A TEACHING HOSPITAL

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**ABSTRACT... Introduction: Objectives:** To find out improvement in visual acuity and complications in low socioeconomic status patients that underwent phacoemulsification with low price IOL in a teaching hospital. **Study Design:** Descriptive study. **Setting:** Department of Ophthalmology Independent University Hospital, Faisalabad. **Period:** One year from 01-04-2016 to 31-03-2017. **Material and Methods:** Composed of 100 patients. In this study Inclusion criteria was poor old aged patients of both gender having grade one to grade three nuclear sclerosis with or without posterior sub capsular cataract. However patients having history of uncontrolled hypertension or diabetes mellitus, inadequate dilated pupil, subluxated lens or having previous history ocular surgery were excluded. **Results:** In this study 100 eyes with cataract operated by phacoemulsification with low cost rigid IOL under peribulbar anesthesia. The mean age of patients was 67.50 years (range 50-85 years). Male patients in this study were fifty Two (52%) While 48% were female Patients. Regarding the visual acuity in operated eyes with or without glasses, 80 eyes (80 %) had visual acuity of 6/6-6/12, visual acuity of 6/18 to 6/36 in 12 eyes and 6 eyes (6 %) had a best corrected visual acuity of 6/60 to CF. While visual acuity less than counting finger (CF) was percent in only 2 percent patients. **Discussion:** Un-operated cataract can induced severe visual impairment or blindness in cataract patients. In a study conducted in Pakistan reported that in about 76% cases of poor socioeconomic status most important barrier to cataract surgery was cost of surgery. According to this study different methods that can be adopted to reduce the cost of surgery by improving efficiency by conducting high volume cataract surgery and bulk purchasing of consumables surgical items especially cheaper intraocular lenses thus allowing even the poorest patients to have ophthalmic care. So it was observed that in patients of poor socioeconomic status numbers of barriers are being faced by such community in which cost is frequently mentioned and providing low cost phaco surgery with good postoperative vision allow to underwent cataract surgery who would not otherwise have it. **Conclusion:** In this study it was concluded that in developing countries like Pakistan in which majority of population belong to low socioeconomic status phacoemulsification with low cost rigid IOL not only yield good post-operative visual acuity but also reduced cataract induced blindness.

**Key words:** Phacoemulsification, Cataract, Rigid IOL.

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### INTRODUCTION

Pakistan, the sixth most populous country in the world in which majority of population belong to low socioeconomic status. The different cause of blindness in Pakistani population are cataract followed by uncorrected refractive error, corneal opacity, glaucoma, Age related macular degeneration, trauma and Diabetic retinopathy.<sup>1</sup>

According to Report of the Pakistan National Blindness and Impairment survey, the leading

cause of blindness in adult population of Pakistan is cataract.<sup>2</sup> Regarding the blindness induced by cataract can be reduced if such patients are operated at adequate time with excellent visual outcome. But unfortunately according to the reports of WHO showed that globally visually impaired population is over 280 million and in which blind population is 39 million.<sup>3</sup> Internationally visual impairment secondary to cataract is 33 % and 51% population worldwide are blind due to cataract.<sup>4</sup>

In Most of developed countries in world, cataract not remained leading cause of visual impairment, but in developing countries still most population blind due to age related cataract. Cataract induced blindness has often been associated with poverty. Several studies in literature reported that people belonging to poor group attribute greater burden of blindness as compared to the rich socioeconomic group. Major causes in such countries includes Economic and social barriers preventing patients from undergoing cataract surgery.<sup>5</sup> Various Studies have reported that financial difficulty is one most important barrier to cataract surgery and that this problem could be efficiently resolved by reducing the surgical fee.<sup>6</sup> Another study showed high Surgical fees are big barrier to undergo cataract surgery especially in developing countries.<sup>7</sup> Because In such elderly patients of age related cataract in the developing countries including Pakistan, mostly such patients not have their own income source to underwent cataract surgery and seeking on their family members for treatment of their disease.

In developing countries other social factors that have been reported as a barriers in preventing patients from undergoing cataract surgery includes illiteracy, lack of transportation, infrastructure, occupation, place of residence and difficult-to-reach proper ophthalmologists as well as with poor access to information and services.<sup>8,9</sup>

Regarding all factors in mind this study with a low cost cataract surgery started in a teaching and trust hospital. AS most of population in catchment area of this hospital belong to low socioeconomic status. Low cost made possible by doing all cataract surgeries on day care basis, reduced minimum hospital admission fee, minimum theater charges and all patient implanted with Fred Hollows Rigid IOL. ("Fred Hollows Foundation". In 1992 this NGO was started in Sydney (Australia). The main purpose of this foundation was raising funds to continue the work of Professor Fred Hollows. Professor Fred Hollows has great contribution in reduction of cataract induced blindness by provide quality of access to ophthalmologists of developing world. In Pakistan, many of poor people go blind

every day due one of preventable cause called cataract. That why Since 1998, The Fred Hollows Foundation and its partners providing great contribution by providing good quality low cost IOL to reduced the rate of blindness.)

So purpose of study was to measure outcome of low cost surgery so that to reduce the rate of cataract induced blindness without comprising the quality of post-operative vision so that WHO VISION 2020 goal of eliminating avoidable vision loss by cataract will be met.

## OBJECTIVES

To find out improvement in visual acuity and complications in low socioeconomic status patients that underwent phacoemulsification with low price rigid IOL in a teaching hospital

## MATERIAL AND METHODS

This descriptive study composed of 100 patients was carried out in department of Ophthalmology Independent University Hospital, Faisalabad for a period of one year from 01-04- 2016 to 31-03-2017. In this study Inclusion criteria was Poor old aged Patients f both gender having grade one to grade three nuclear sclerosis with or without posterior sub capsular cataract. However Patients having history of uncontrolled hypertension or diabetes mellitus, inadequate dilated pupil, subluxated lens or having previous history of ocular surgery were excluded. Similarly patients of good socioeconomic status interested in phaco with costly foldable IOL were also excluded.

## Data Collection Methods

Poor Patients who fulfilled the inclusion criteria were enrolled and consent was taken before surgery from all patients. Before surgery Visual acuity Assessment of both eyes, intra-ocular pressure measurement by Goldman Applanation tonometer was documented. After that complete anterior segment examination by slit lamp & posterior segment by ophthalmoscope was done. IOL power calculations was recorded by measuring axial length and Keratometry readings of operated eye. Routine laboratory investigations that includes Blood complete examination with ESR, urine complete, Serum sugar level and

Hepatitis B & C Antigen were advised to all patients. After all aseptic precautions surgery was started. In all patients Peribulbar anesthesia was given about half hour before surgery. Silk 4/0 black for Superior rectus suture was used in patients with strong Bell’s phenomena. Routine Tropicamide 1% & phenylephrine 10% eye drops were used for Pupils dilatation. But in few diabetic patients atropine Sulphate was used for proper dilation. Three steps tunnel incision was made by 3.2 mm phaco keratome at about 11 O’ clock position along with two side ports for Capsulorhexis and chopper insertion during surgery. Methylene blue for Capsular staining was used especially in mature cataracts. Capsulorhexis, Conjunctival Peritomy and hydrodissection by hydrodissection cannula was done before to start phaco. Oertli (catarhex easy) phaco machine was used for bimanual phacoemulsification in all cases. After performing uneventful phaco the residual cortical matter was removed by irrigation & aspiration canula. 5.5 mm phaco keratome was used for inserting rigid PMMA IOL (Fred Hollow) followed by single 10/0 nylon suture at main incision site. Routine sub-conjunctival injection of Gentamycine and dexamethasone injected in all operated patients. Antiseptic dressing was done at end of surgery and patients send back to home after two hours stay in hospital. Routine follow up done in all Patients according to Performa. In all patients on follow-up best corrected visual acuity, early pre-operative and late- postoperative complications were noted. Statistical packages for social science (Spss.10) were used to analyze data. Relevant descriptive frequency and percentage was computed.

**RESULTS**

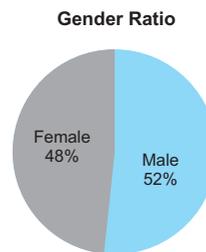
In this study 100 eyes with cataract were operated by Phacoemulsification with Low cost rigid IOL under peribulbar anesthesia. The mean age of patients was 67.50 years (range 50-85 years). Male patients in this study were fifty two (52%) While 48 % were female patients (Figure-1). In about Sixty patients Diabetes mellitus or hypertension, or both diseases were present. Hepatitis B or C or both were positive in Forty Patients.

Various intra-operative complications that

occurred were Nucleus fragments drop (2%), Nucleus drop (1%), Posterior capsule rent (PCR) in three eyes,. 1 eye (1%) had a Descemet’s membrane detachment. Other complications that occurred includes Sub-conjunctival hemorrhage in 15%, conjunctival chemosis in 10% patients and Iris damage occurred in 2 % cases during intra-operative period.

In early postoperative period, different complications included were striate Keratopathy in 15 %, bullous Keratopathy in two patients and Uveitis with grade 3 cells in 10(10%) eyes. Post-operative Endophthalmitis noted in only one case. In only three patients residual Lens matter was present during post-operative period. During follow up, late post-operative complications that were noted were cystoid macular edema in 2 %, Decentration of IOL in 1% and posterior capsular opacification in 3 % cases.

Regarding the visual acuity in operated eyes with or without glasses, 80 eyes (80 %) had visual acuity of 6/6-6/12, visual acuity of 6/18 to 6/36 in 12 eyes and 6 eyes (6 %) had a best corrected visual acuity of 6/60 to CF. While visual acuity less than Counting finger (CF) was percent in only 2 percent Patients.



**Figure-1. Gender wise distribution of Patients**

Intra-operative complications	Number of Patients	Percentage
Nucleus fragments drop	2	2%
Nucleus drop	1	1%
Posterior capsular rupture	3	3%
Iris damage	2	2%
Subconjunctival hemorrhage	15	15%
Descemet membrane detachment	1	1%
Conjunctival chemosis	5	5%

**Table-I. Intra-operative complications**

Post-operative complications	Number of Patients	Percentage
Striate Keratopathy	15	15%
Uveitis	10	10%
Endophthalmitis	1	1%
Decentration of IOL	1	1%
Residual Lens matter	3	3%
Bullous Keratopathy	2	2%
CMO	2	2%
PCO	3	3%

**Table-II. Post-operative complications**

Vision	Number of Patients	Percentage
6/6--6/12	80	80%
6/18—6/36	12	12%
6/60—CF	6	6%
Less than CF	2	2%
Total	100	100%

**Table-III. Post-operative best corrected visual acuity**

## DISCUSSION

Un-operated cataract can induced severe visual impairment or blindness in patients. In a study conducted in Pakistan reported that in about 76% cases of poor socioeconomic status most important barrier to cataract surgery was cost of surgery. According to this study different methods that can be adopted to reduce the cost of surgery by improving efficiency by conducting high volume cataract surgery and bulk purchasing of consumables surgical items especially cheaper intraocular lenses thus allowing even the poorest patients to have ophthalmic care.<sup>10</sup>

Similarly in a study of Syed A, Polack S, Eusebio C et al. conducted in Kynea reported different barriers to cataract includes low education, Lack of awareness and family income level in different reports. Financial problems were the leading reason provided by patients responsible for high rate of cataract induced blindness in developing countries.<sup>11</sup>

In ophthalmology cataract surgery is the most common procedure performed worldwide because it one of the most cost-effective surgical treatment as compared to other ophthalmic surgeries in terms of the quality of vision restored.<sup>12</sup>

Another reality about cataract that it is the major source of earning for many ophthalmologists. Other benefits of cataract surgery as compared other surgical procedures it is fast, relatively risk free, mostly done on day care basis, no need of general anesthesia and rapid recovery of patients. Due to all above mentioned reasons this makes it the not only favorite procedure for operating surgeons, but also for pharmaceutical industry and hospital administrators.

However according to one of report of the WHO estimates that 161 million people internationally have visual impairment. Out of 161 million people 37 million are completely blind while 124 million peoples have different degree of visual impairment. Unfortunately Cataract is still the leading cause of blindness in developing countries. Accord to one report, it is responsible for 16 million cases of blindness due to untreated cataract while 50 million patients having low vision.<sup>13</sup> In South Asian countries like In Pakistan, 66% of the blindness is due to cataract.<sup>14</sup> The standard treatment for cataract patients is surgery in which catarectous lens is replaced by an intraocular lens (IOL). Different techniques used for cataract extraction now a days are conventional extracapsular cataract extraction (ECCE), Small incision Cataract surgery (SICS) and phacoemulsification. Out of these, phacoemulsification is now the gold standard. As compared to other techniques, phacoemulsification having the advantage of faster wound healing, reduced postoperative astigmatism and least wound related complications mainly due to the smaller incision. Differant demerits of phacoemulsification includes very high cost of phaco and long learning curve. The reason of high cost of phaco is due costly phaco machine and second due to different types of costly IOL used after phaco surgery due their different advantages. Now a day currently used different types of IOL used after phaco includes Monofocal, Multifocal and Accommodative Lens. But most of these Lens are sale in market at very high price in market especially foldable IOL.

In spite of all above mentioned surgical methods with good visual outcome, blindness due to cataract in developing countries is still very high.

So in this study Financial barrier was addressed by doing cataract surgery on day care basis, no phaco machine charges and implanting all poor patients with Rigid PMMA IOL provided by International NGO (Fred Hollows Foundation of Sydney, Australia) In Pakistan.

One hundred eyes underwent phacoemulsification with rigid intraocular Lens implantation during study period. Few very poor patients not completed complete follow up mostly likely cause may be long traveling distance expenses because mostly Patients coming in this hospital belong to rural areas. Second possibility in such patients not completing Follow up were Patients with early good postoperative Visual acuity.

In this study during post-operative period, best corrected visual acuity (BCVA) between 6/6-6/12 in 80% cases. while In 12(12 %) eyes best corrected visual acuity (BCVA) was in between 6/18-6/36. visual acuity between 6/60-CF and less than CF reported in only 6% and 2 % cases respectively.

During study, in patients who cannot achieve good visual acuity either had postoperative high astigmatism mostly secondary to single suture applied that improved vision after suture removal or due to different kinds of fundus pathologies like Age related macular degeneration or diabetic retinopathy complications in patients of long standing diabetes.

A study conducted by Mohammad Alam, Zafar Iqbal on Comparison of Visual Acuity and Astigmatic Changes in Phacoemulsification with Posterior Chamber Foldable Vs Non Foldable Intraocular Lens Implant in 2007. Results of their study showed at the end of last follow up in group of patients with foldable IOL 84% patients had best corrected VA (BCVA) of 6/6 while 16% had VA 6/9. While in Patients With Rigid IOL 80% of patients had VA 6/6, 16% 6/9 while 4% had VA 6/12.<sup>15</sup>

So best corrected Visual acuity with Rigid IOL after Phaco in this study are nearly comparable with to our study. Similarly in other study in 2004 by Iftikhar and Kiani reported that phacoemulsification with

implantation of 6mm PMMA intraocular lenses yields acceptable levels of post-operative visual acuity.<sup>16</sup>

However Better results are showed by Phaco with different types of foldable IOL in some other studies. As in study of Agarwal et al Phaco with Foldable IOL reported that 6/6 vision in 76% Patients and 6/9 in 24% patients at end of one month.<sup>17</sup>

Similarly Khan et al conducted study on both foldable and non-foldable IOL. They concluded that in 58% patients, visual acuity of both foldable and non-foldable IOL was 6/6 – 6/12, while in 18% cases visual acuity was 6/18 and lesser than 6/18 found in only 24% patients. These results are not comparable to our study.<sup>18</sup>

The different per-operative and post-operative complications mentioned in this study not related to type of IOL used during phaco rather experience of operating surgeon. However few Complications that are mentioned in literature may be related to IOL type Like uveitis, posterior capsular opacification (PCO) and Mal-position of IOL. In this study low grade Uveitis occurred in 15 % of our cases. Such patients were managed conservatively with topical steroids. IOL Decentration occurred in one eye. While PCO reported in 4% cases. While Antony et al in their three years study period , reported incidence of PCO 3.5% of cases.<sup>19</sup> whereas, Spratt et al by using hydrophilic IOLs reported it 1.8% at 30 months study period.<sup>20</sup>

So We have observed that in Patients of poor socioeconomic status numbers of barriers are being faced by such community in which cost is frequently mentioned and providing low cost phaco surgery with good postoperative vision allow to underwent cataract surgery who would not otherwise have it. Similarly some studies also reported that when such patients with cataract were operated in one eye and they enjoyed good post-operative vision in that eye such patients were more inclined to accept surgery in second eye as compared to those patients who had poor post-operative that thing show importance of

good post-operative vision on decision making by the patients.<sup>21</sup>

This study showed that the phacoemulsification with low cost rigid IOL in poor patients is an effective, safe, and predictable method of improving visual acuity and preventing cataract induced blindness in poor socioeconomic population.

## CONCLUSION

In this study we have concluded that in developing countries like Pakistan in which majority of population belong to low socioeconomic status phacoemulsification with low cost rigid IOL not only yield good post-operative visual acuity but also reduced cataract induced blindness.

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## PREVIOUS RELATED STUDY

Faheem Ahmad, Syed Ali Haider, Dropped nucleus during phacoemulsification; outcomes (Original) Prof Med Jour 18(4) 715-721 Oct, Nov, Dec 2011.

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*When life get blurry,  
adjust your focus.*

– Unknown –

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## AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Faheem Ahmad	Concept, Design data collection critical expertise writing & final approval.	
2	Syeda Iqra Iqbal	Help in data collection.	