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Visual outcome following clear corneal incision phacoemulsification with rigid intra-ocular lens and small incision cataract surgery in low socioeconomic group patients: A comparative analysis in a teaching hospital in South India

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ABSTRACT

Background: Cataract is the most common cause of curable blindness worldwide. **Aims and Objectives:** A comparative analysis of clear corneal phacoemulsification with rigid intra-ocular Lens (IOL) and small incision cataract surgery (SICS) in low socioeconomic group patients in terms of post-operative visual outcome, surgically induced astigmatism (SIA), and intra-and post-operative complications. **Materials and Methods:** A prospective hospital-based comparative study was conducted for 8 months in 424 eyes of 400 senile cataract patients divided into PHACO and SICS groups. Each group consisted of 212 eyes of 200 patients. Detailed examinations for best corrected visual acuity (BCVA), SIA, and complications were evaluated on the 1st post-operative day, 1st week and 6 weeks postoperatively. **Results:** BCVA 6\18 or higher was 95.38% in the phacoemulsification group and 94.81% in the SICS group. The study revealed good visual outcome in both SICS and Phaco groups with no significant difference. The mean SIA was more in SICS group (−0.96±0.57) than in phaco group (−0.71±0.47) which was statistically significant. In terms of complications, no significant difference was noted between the groups. **Conclusion:** The outcome of this study indicated that though SIA is more in SICS group than Phaco group, there is no difference between the groups in terms of visual outcome. The study has proven that SICS has comparable effectiveness as phacoemulsification with rigid IOL, which should be considered in low- and middle-income countries.

Key words: Cataract; Small incision cataract surgery; Phacoemulsification; Rigid intra-ocular lens; Visual outcome; Surgically induced astigmatism

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INTRODUCTION

Senile cataract is an age-related, vision-impairing disease characterized by gradual, progressive opacification and thickening of the lens. Cataracts remain the number one cause of treatable blindness worldwide and developing countries account for three-quarters of these cases of blindness.[1,2] Cataracts have been the cause of 50–80% of bilateral blindness in India.[3] India is a large and diverse country. The elderly population in India has increased from 24.71 million in 1961 to 138 million elderly persons in 2021, comprising 67 million males and 71 million females.[4] Blindness is noticeably more severe in India due to ignorance, poverty, and lack of medical resources in peripheral areas.[5,6]

Visual impairment has a measurable impact on quality of life. Since, cataracts are the leading cause of bilateral

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blindness in India,[7] The National Program for control of blindness and Visual Impairment (NPCB and VI) aims at clearing the backlog of blindness due to cataract. The programs are increasing the number of surgical facilities for the needy population. Furthermore, in highly populated developing country like India, cataract mostly being an elective surgery, many patients who are aged and poor, staying in sub urban and rural areas choose to get operated in free camps organized by charitable associations.

Cataract surgery may be considered among the most successful treatments in all of medicine.[8] The earliest known technique of treating a cataract was couching which dates back to 5th century BC and remained predominantly dominating till 18th century.[9] In couching method, the cataract was not removed but dislodged out of visual axis with a needle. This technique provided instantaneous improvement in vision but later triggered severe inflammatory reaction due to retained lens in the eye and often resulted in blindness.[10] Later in 1747, in Paris, a French surgeon named Jacques Daviel invented a new technique called Extra Capsular Cataract Extraction (ECCE) which was more effective than couching with an overall success rate of 50%. Here a large corneal incision of around 10 mm was made and the lens capsule was punctured and nucleus was expressed out, the remaining cortical matter was removed by curettage. Though ECCE was more effective than couching, the post-operative complications such as poor wound healing, retained lens remnants, posterior capsular opacification, and infection were considerable.[11] The first Intra Capsular Cataract surgery was done in 1753 by Samuel sharp where in the entire lens including the lens capsule was removed through a large limbal incision because of the potentially blinding complications associated with Intra Capsular Cataract Extraction such as retinal detachment, macular edema, and corneal decompensation due to removal of lens capsule,[8] ECCE technique remained the standard of care for cataract extraction till the evolution of manual small incision cataract surgery (SICS) and phacoemulsification techniques. The incredible success of cataract surgery would not have been possible without the remarkable innovations in the field of intra ocular lenses (IOL) from Harold Ridley's first IOL implantation in 1949 till the evolution of rigid Posterior Chamber IOLs, foldable IOLs, multifocal IOLs, toric IOLs, and various types of IOL.

With the advent of manual SICS, the size of the surgical incision reduced to 6–6.5 mm which promotes early wound healing and lesser surgically induced astigmatism (SIA). Furthermore, manual small incision cataract surgeries being more cost effective, non-machine dependent, fast, safe, and requiring less surgical expertise is commonly performed in developing countries where numerous cataract surgeries are done.[12]

However, we all know that one of the most revolutionizing developments in the history of cataract surgery is the technique of reducing a cataract to minute particles by ultrasonic vibration and aspirating them by controlled suction, which was invented by an American Ophthalmologist Charles Kelman in the year 1967.[13] Phacoemulsification with foldable IOL is the best proven technique for senile cataract in modern era of Ophthalmology. Many studies suggest that there is no significant difference in the visual outcome of either of the techniques.[14-16] However, some surgeons prefer to do clear corneal incision phacoemulsification and enlarge the incision and place a rigid IOL which by virtue of being more cost effective than a foldable IOL, are mostly provided for charitable cataract surgeries. Furthermore, it is not affordable to provide foldable lens for the huge population in a developing country like India. Many studies have compared the outcome of phacoemulsification with foldable lens and SICS, whereas phacoemulsification with rigid IOL implantation technique is practiced only in some charitable hospitals for low socioeconomic group patients. Not many studies are conducted on comparison of visual outcome following phacoemulsification with rigid IOL and SICS, especially in Karnataka State to the best of our knowledge.

Hence, the current study was taken up to do a comparative analysis of visual outcome following clear corneal incision phacoemulsification with rigid IOL and manual SICS technique in terms of final best corrected visual acuity (BCVA), SIA and intra-operative and post-operative complications.

Aims and objectives

To do a comparative analysis of clear corneal phacoemulsification with rigid Intra Ocular Lens and Small Incision Catarct Surgery in low socioeconomic group patients in terms of post operative visual outcome, surgically induced astigmatism and intra operative and post operative complications.

MATERIALS AND METHODS

Study design

A hospital-based prospective comparative study with convenient sampling technique.

Study period

The study period was 8 months duration from February to September 2022.

Study population

Patients aged above 50 years with senile cataract who required cataract surgery.

Study place

The study was conducted in a teaching hospital affiliated to a renowned medical college located in North Western part of Karnataka, India.

Ethical clearance

The institutional ethical clearance (Ref NO. MDC/JNMCIEC/308 dated January 11, 2022) was obtained before the start of the study.

Patients who required cataract surgery were subjected to complete evaluation, total 424 eyes of 400 patients formed the study population.

Inclusion criteria

Clear cornea, senile cataract of any grade except morgagnian cataract, intra-ocular pressure (IOP) within normal limits, no or minimal (0.25D) with the rule astigmatism and no any anterior segment or posterior segment disorders were included in the study.

Exclusion criteria

Any corneal pathologies, morgagnian cataract, complicated cataracts such as traumatic cataract, cataract with anterior or posterior synechiae, pseudoexfoliation on the lens, subluxated or dislocated lens, lens induced glaucoma, posterior segment pathologies, need for concomitant ocular surgeries, patients with IOP more than 21, regurgitation on sac syringing, any ocular infections and those who did not wish to be part of the study.

Study procedure

Preoperatively, it was mandatory to obtain physical fitness for the said surgery for all the patients. B Scan was done to rule out fundal pathologies in case of mature cataracts.

After applying inclusion and exclusion criteria, patients were categorized into Group A (Phaco group) - 200 patients (212 eyes) and group B (SICS group) - 200 patients (212 eyes). Informed consent was taken from all patients before the surgery.

Patients of both the groups underwent a thorough pre-operative examination which included: Uncorrected Visual Acuity (UCVA), objective and subjective refraction, BCVA, automated keratometry (K1, K2) and axial length measurement, and IOL power estimation. All patients underwent Sac syringing, IOP measurement, and anterior segment examination by slit lamp biomicroscope and after dilating the pupils with tropicamide 0.8% and phenylephrine ophthalmic solution fundoscopy was done using IDO with 20 D or 90 D with slit lamp. All patients were given peribulbar local anesthesia of 6 mL of lignocaine 2%, 4 mL of bupivacaine 0.05% mixed with 1500 IU hyaluronidase using a 10 cc syringe with 26 Guage needle.

Patients in Group A underwent phacoemulsification and the corneal incision (11'O Clock position) was increased from 2.8 mm to 5.5 mm while implanting a 5.5 mm rigid IOL.

The corneal incision tunnel width was 1.5 mm. Phacoemulsification was performed on an Alcon Legion Phaco device. Patients in Group B underwent manual SICS. A 6–6.5 mm long straight incision was made at a distance of 1.5 mm from the upper limbus and a 6 mm rigid IOL was implanted. All patients in both groups were operated by a single surgeon. The post-operative period was observed on the 1st post-operative day, 1st week and 6th week after surgery. BCVA was evaluated at 6 weeks postoperatively. Patients were evaluated according to the following criteria:

1. UCVA on the 1st post-operative day
2. BCVA at 6 weeks post-operative follow up
3. Surgically induced post-operative astigmatism
4. Intra-operative and post-operative complications.

Statistical analysis

Data were analyzed using Statistical Software R version 4.2.1. and Microsoft Excel. Categorical variables are presented as frequencies and percentages. Continuous variables are presented in the format Mean±SD/Median (Min, Max). The normality of variables is tested with Shapiro–Wilk test and QQ plot. The Mann–Whitney U-test is used to compare the distribution of different variables across groups. The Chi-square test is used to test the relationship between categorical variables. P=0.05 or less indicates statistical significance.

RESULTS

The study population consisted of 424 eyes of 400 patients between the ages of 51 and 89 years with a mean age of 69.81±8.79 years. Of the 400 patients, 200 (212 eyes) underwent phacoemulsification and rigid IOL implantation, and 200 (212 eyes) underwent SICS. The two study groups, Group A (phaco) and Group B (SICS), were comparable with respect to age, sex, IOL powers, keratometry, and axial length measurements. Table 1 compares the two groups based on demographic and clinical characteristics. Figures 1-6 shows a graphical representation of the same data.

From Mann–Whitney U test, it is observed that, there is no significant difference in the distribution of age, IOL, K1, K2, and AL over groups.

Table 1: Comparison of different variables over groups

Variables	Sub category	Phaco (Group A)	SICS (Group B)	Total	Test statistic	P-value
Age (years)	Mean±SD median (min, max)	69.25±9.19 68 (51, 89)	70.37±8.36 69 (54, 87)	69.81±8.79 69 (51, 89)	W=18587	0.2211^{MW}
Gender	Female	105 (52.5)	103 (51.5)	208 (52)	χ^2=0.040064	0.8414^{C}
	Male	95 (47.5)	97 (48.5)	192 (48)		
IOL	Mean±SD median (min, max)	21.02±1.86 21.25 (16, 26)	20.81±2.28 21.5 (2.5, 25)	20.92±2.08 21.5 (2.5, 26)	W=20422	0.713^{MW}
K1	Mean±SD median (min, max)	43.88±1.66 44 (40, 48)	43.69±1.7 43.75 (40, 48)	43.79±1.68 44 (40, 48)	W=21175	0.3082^{MW}
K2	Mean±SD median (Min, max)	44.26±1.85 44 (40, 48.75)	44.38±1.7 44.25 (40.25, 48.75)	44.32±1.77 44.25 (40, 48.75)	W=18893	0.3372^{MW}
AL	Mean±SD median (min, max)	23.1±1.01 23.12 (20.18, 25.89)	23.28±1.01 23.4 (20.89, 26.98)	23.19±1.01 23.22 (20.18, 26.98)	W=18112	0.0866^{MW}

MW: Mann–Whitney U test, C: Chi-square test, SICS: Small incision cataract surgery, IOL: Intra-ocular lenses

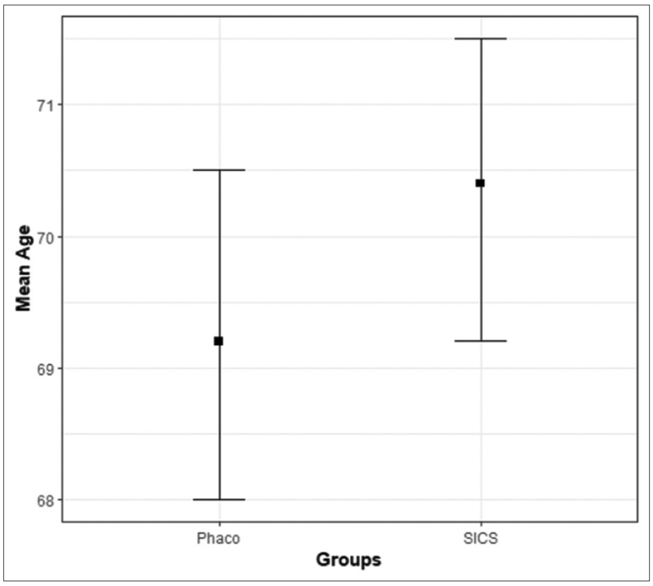

Figure 1: Mean plot of age over groups

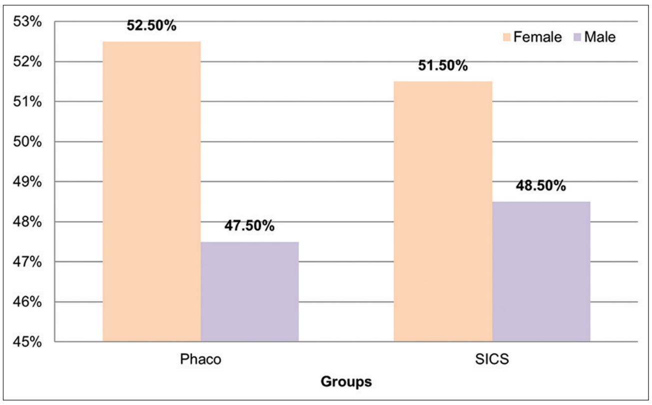

Figure 2: Distribution of gender over groups

From Chi-square test, it is observed that, there is no significant difference in the distribution of age over groups.

In the current study, pre-operative visual acuity was comparable in both groups, with most subjects classified

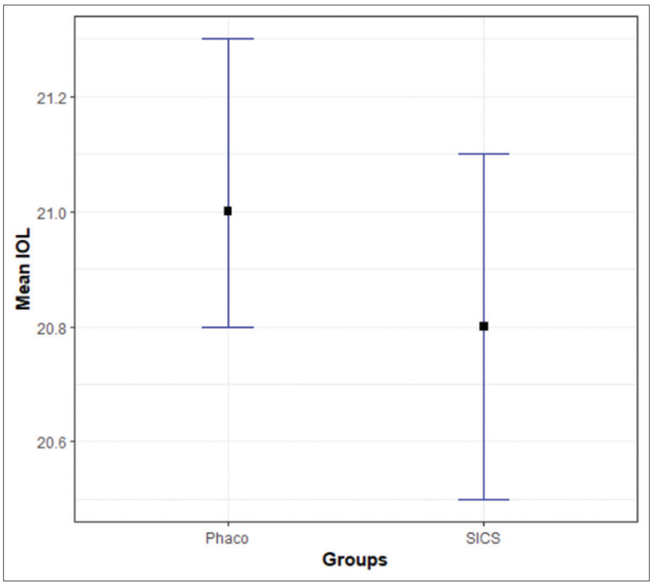

Figure 3: Mean plot of intra-ocular lenses over groups

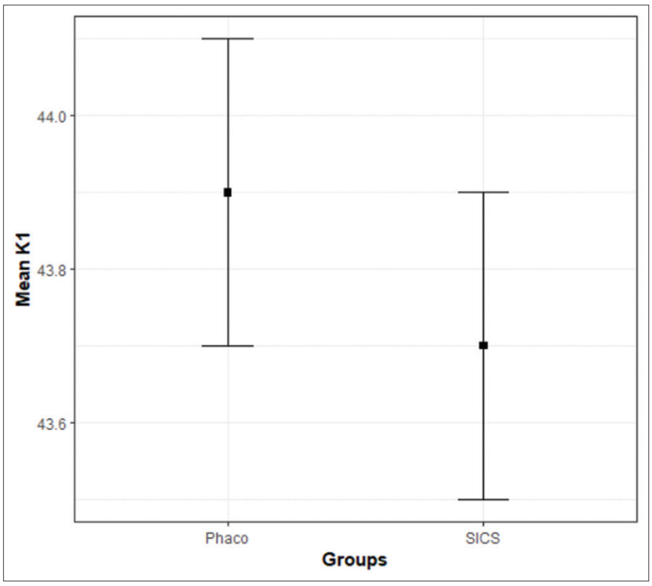

Figure 4: Mean plot of K1 over groups

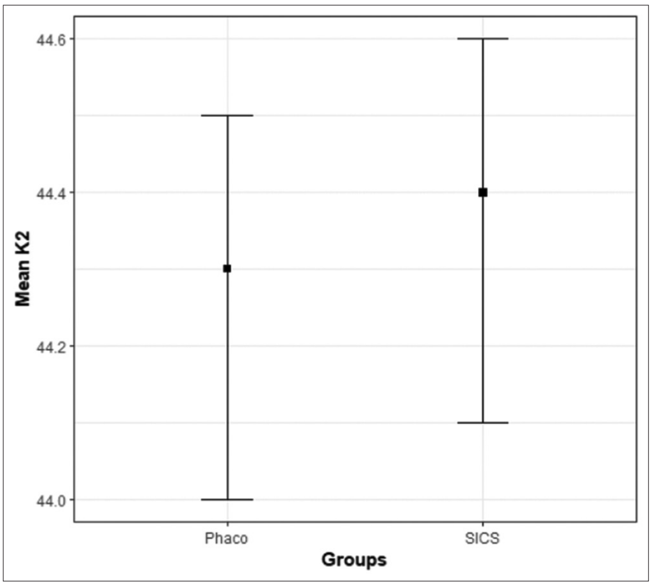

Figure 5: Mean plot of K2 over groups

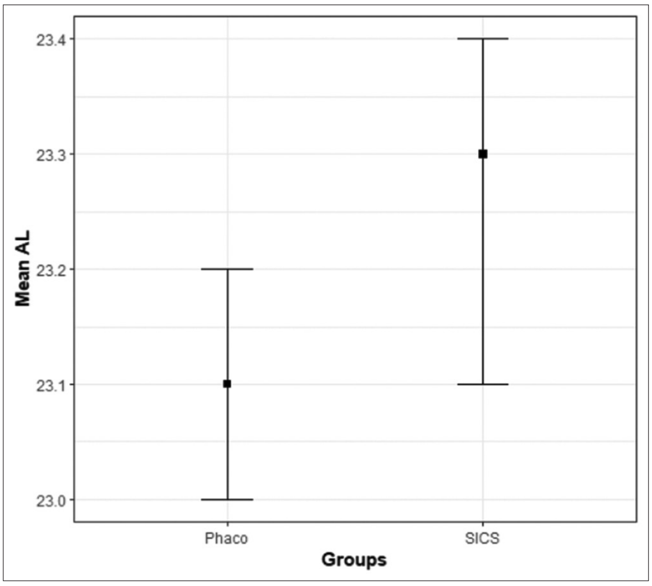

Figure 6: Mean plot of AL over groups

as moderate visual acuity ranging from 6/24 to 6/36, 123 patients (58.02%) in the phacoemulsification group and 118 patients (55.66%) in the SICS group. However, there was a statistically significant difference in the distribution of nuclear sclerosis, 126 patients (59.43% patients) and 92 (43.4%) patients had NS1 to NS2 grade cataract in phaco group and SICS group, respectively, and nuclear sclerosis grading 3 to 4 was seen in 84 (39.62%) subjects in phaco group and 109 (51.42%) subjects in SICS group. Phaco group had significantly less mature cataracts compared to SICS group of patients.

There was no statistically significant difference in the post-operative visual outcome, the chief outcome measure of the study. On first post-operative day, the UCVA was between 6/6 and 6/18 in 194 (91.51%) patients of Phaco group and 181 (85.38%) patients of SICS group. 18 (8.49%) patients had vision between 6/24 and 6\60 in phaco group and 29 (13.68%) patients in SICS group. None of the patients had vision between 6\60 and 3\60 in phaco group but two patients in SICS group had vision between 6\60 and 3\60. There was no statistically significant difference in visual outcomes on the 1st day after surgery between the two groups.

Similarly, post-operative BCVA at 6-week follow-up was between 6/6 and 6/18 in 202 (95.28%) and 201 (94) patients in the phacoemulsification group.

Moderate visual outcome between 6/24 and 6/60 was observed in 10 patients (4.72%) in the phacoemulsification group, and 11 patients (5.19%) in the SICS group, and there were no patients falling in visual acuity <6/60 in both groups.

In the present study, the mean value of SIA was statistically lower in the phacoemulsification group (0.96±0.57) compared to SICS group (0.71±0.47).

Visual acuity comparisons before and after surgery and SIA are shown in Table 2 and Figures 7-11.

From Chi-square test, it is observed that, there is significant difference in the distribution of grade of cataract over the two groups. However, there is no significant difference in the distribution of pre-op vision, POD 1 vision and BCVA 6th week vision over the two groups.

From Mann–Whitney U test, it is observed that, there is significant difference in the distribution of SIA at 6th week between the two groups.

The overall intra-operative complication rate was 4% in the phacoemulsification group and 6.5% in the SICS group. There was no statistically significant difference in complications between the SICS and phacoemulsification groups. Iris prolapse and iris dialysis were less in the phacoemulsification group (0.5%, 0) than in the SICS group (1.5%, 0.5%), respectively. Three patients in the phacoemulsification group required suturing to fix the wound and five patients in the SICS group required suturing for tunnel closure. PCR was encountered in two cases in both the phacoemulsification group and the SICS group, and anterior chamber IOL (ACIOL) (6 mm) implantation was done. While implanting ACIOL in phaco patients, the corneal incision was extended till 6 mm.

A comparison of intraoperative and post-operative complications of the two groups is shown in Table 3.

Table 2: Comparison of vision related variables over groups

Variables	Sub category	Phaco (%)	SICS (%)	Total (%)	Test statistics	P-value
Pre-Op vision	6/6–6/18	15 (7.08)	17 (8.02)	32 (7.55)	χ^2=0.9775	0.8067^{C}
	6/24–6/36	123 (58.02)	118 (55.66)	241 (56.84)		
	6/60–3/60	59 (27.83)	57 (26.89)	116 (27.36)		
	<3/60	15 (7.08)	20 (9.43)	35 (8.25)		
POD 1 vision	6/6–6/18	194 (91.51)	181 (85.38)	375 (88.44)	χ^2=5.0251	0.06897^{MC}
	6/24–6/60	18 (8.49)	29 (13.68)	47 (11.08)		
	<6/60	0	2 (0.94)	2 (0.47)		
BCVA 6^{th} week	6/6–6/18	202 (95.28)	201 (94.81)	403 (95.05)	χ^2=0.0501	0.8229^{C}
	6/24–6/60	10 (4.72)	11 (5.19)	21 (4.95)		
SIA at 6^{th} week	Mean±SD median (min, max)	−0.71±0.47−0.75 (−2.25, 0)	−0.96±0.57−1 (−2.5, 0)	−0.84±0.54−0.75 (−2.5, 0)	W=28273	$<0.001^{MW*}$
Grade of cataract	NS+1 to NS+2	126 (59.43)	92 (43.4)	218 (51.42)	χ^2=14.772	$<0.001^{C*}$
	NS+3 to NS+4	84 (39.62)	109 (51.42)	193 (45.52)		
	Mature cataract	2 (0.94)	11 (5.19)	13 (3.07)		

C: Chi-square test, MC: Chi-square test with Monte Carlo simulation, MW: Mann–Whitney U test, *indicates statistical significance, SICS: Small incision cataract surgery, BCVA: Best corrected visual acuity, SIA: Surgically induced astigmatism

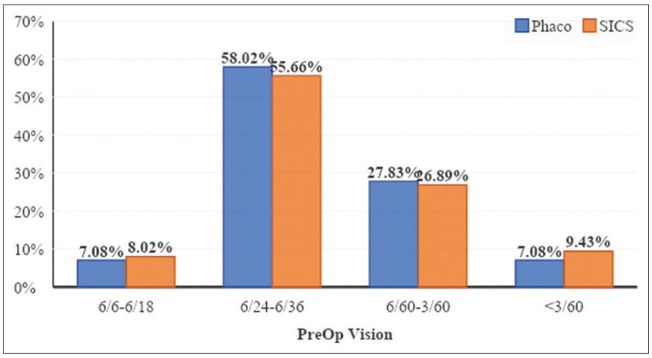

Figure 7: Distribution of pre-op vision over groups

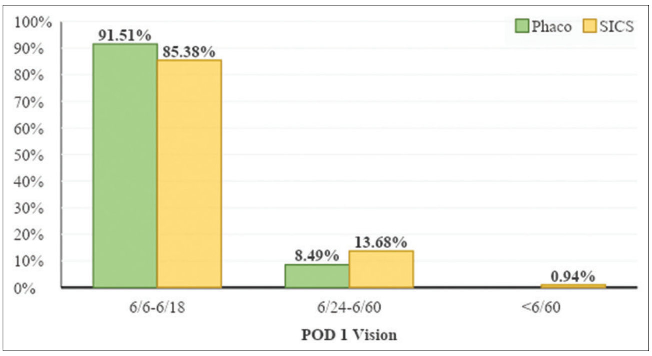

Figure 8: Distribution of POD 1 vision over groups

From the Chi-square test, it is observed that there is no significant difference in the distribution of intra-op and post-op complications over the two groups.

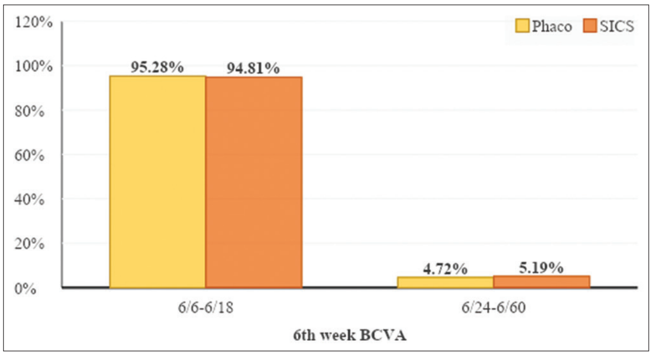

Figure 9: Distribution of 6^{th} week Best Corrected Visual Acuity vision over groups

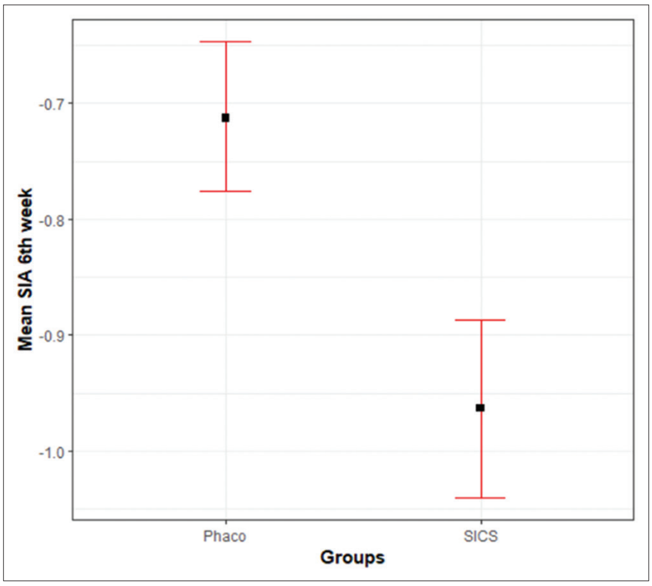

Figure 10: Mean plot of surgically induced astigmatism at 6^{th} week over groups

DISCUSSION

Cataracts are the leading cause of blindness worldwide and are almost always a treatable disease but socioeconomic burden is an additional factor in developing countries. It is one of the major ophthalmic public health problems in both developed and developing countries.[17] An uneventful cataract surgery with good visual outcome is all surgeons want for every patient they operate on. Good post-operative visual results improve patient satisfaction and quality of life. According to a recent study, 36 million people worldwide are blind, and more than 12 million are blind due to cataracts.[18] The importance of cataract blindness lies in the fact that more than 90% of all disability-adjusted lives lost due to cataracts are in developing countries.[19]

Cataract surgery has undergone many changes. The incision size gradually decreased over time from 12.0 mm for intracapsular cataract extraction to 2.2–2.8 mm for phacoemulsification. Both SICS and phacoemulsification have become popular and common techniques in cataract surgery.[12] Phacoemulsification using a foldable IOL is the main method of cataract surgery in developed countries. However, in developing countries, rigid IOL phacoemulsification and SICS have become alternatives to foldable IOL phacoemulsification, providing affordable cataract surgery for low-income patients.

The main objective of this study is to make a comparative analysis of phacoemulsification with rigid IOL and SICS in low socioeconomic patients.

The clinical and sociodemographic variables were comparable in both the groups of the present study. The mean age of the study population in SICS group was 70.37±8.36 years and 69.25±9.19 years in phaco group.

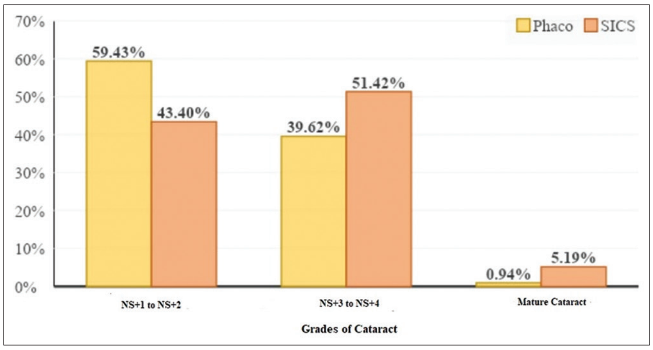

Figure 11: Distribution of grade of cataract over groups

In the present study, on 1st post-operative day, a good visual outcome between 6/18 and 6/6 (UCVA) was noted in 194 patients (91.5%) of phaco group patients and in 181 patients (85.38%) of SICS group.

During 6th week of postoperative follow-up, the BCVA was between 6/6 and 6/18 in 202 (95.28%) patients of phaco group and 201 (94.81%) patients of SICS group. Ten (4.72%) patients of phaco group, 11 (5.19%) patients in the SICS group) had visual acuity between 6/60 and 6/24. The mean SIA was 0.71±0.47 in the phacoemulsification group, which was statistically significantly lower than the SIA of 0.96±0.57 observed in the SICS group.

In the present study, there were no statistically significant differences in the distribution of visual outcomes for post-operative day 1 visual acuity (UCVA) and 6-week BCVA between patients in the SICS and phacoemulsification groups.

The post-operative visual outcomes of both groups in our study are in compliance with the World Health Organization (WHO) recommendations. Visual outcome of the surgical criteria set by WHO[20] are: Good outcome is defined as 6/6–6/18, borderline outcome as <6/18–6/60, and poor outcome with BCVA <6/60.

Pararajasegaram suggested that more than 90% of patients operated for cataract with lens implant should have good grade of vision (BCVA 6/6–6/18) and <5% of operated cataract should have BCVA <6/60.[21]

But recently, WHO and International Agency for the Prevention of Blindness (IAPB) have recommended that more than 85% of operated cataract cases should have good grade of vision (6/6 to 6/18) (IAPB Action Plan). Therefore, at least 85% of the operated eyes should have VA ≥6/18 after cataract surgery and <5% should have BCVA <6/60.[22]

Limburg recommended that more than 80% of eyes at 4 weeks after cataract surgery should have VA ≥6/18 with pinhole.[23]

Table 3: Comparison of intra-op and post-op complications over groups

Variables	Sub category	Phaco (%)	SICS (%)	Total (%)	Test statistic	P-value
Post-op complications	Shallow AC	0	1 (0.5)	1 (0.25)	χ^2=3.6253	0.9395^MC^
	Iris prolapse	0	1 (0.5)	1 (0.25)		
	Re-suturing	0	2 (1)	2 (0.5)		
	Striate keratitis	6 (3)	7 (3.5)	13 (3.25)		
	Hyphema	1 (0.5)	2 (1)	3 (0.75)		
	UWM	1 (0.5)	2 (1)	3 (0.75)		
	RLM	0	1 (0.5)	1 (0.25)		
	Macular edema	1 (0.5)	1 (0.5)	2 (0.5)		
Total		9 (4.5)	17 (8.5)	26 (6.5)		

MC: Chi-square test with Monte Carlo simulation, SICS: Small incision cataract surgery

The visual outcome results observed in the present study are similar to studies done by[24] Hennig et al. in Nepal wherein there was no significant difference in the visual outcome of phacoemulsification using either rigid IOL or foldable PCIOL. They also concluded that the use of inexpensive and rigid PMMA IOLs would make phacoemulsification more accessible to poor patients in low and middle-income countries.

A study done by Tyagi et al.[25] revealed overall good visual outcome 6/6 to 6/9 with phaco with rigid IOL group showing better results (73.15%) than SICS (50%). The mean SIA at the end of 6 weeks in phaco group was 1.10±0.51 compared to 1.22±0.42 in SICS group which was statistically not significant.

Whereas a study done by[26] Devendra et al. concluded that SICS by virtue of being a faster surgery with more secured wound and statistically less astigmatism is a better option in camp patients in rural areas as compared to phacoemulsification with rigid IOL. The mean SIA at the end of 4 weeks was higher in phaco group (2.06D) than SICS group (0.98D).

A meta-analysis study which analyzed 11 comparative studies documenting 76,838 eyes done by Gogate et al. indicated that there is no visual outcome difference between phacoemulsification and SICS. Endothelial cell loss and intraoperative and post-operative complications were similar between the two procedures. SICS resulted in statistically greater astigmatism in their study.[14]

Semanyenzi found that both types of surgery showed identical surgical results at 1, 3, and 6 months, respectively.[27]

A study done by Ammous et al.[28] has shown statistically significant lesser astigmatism in Phaco group (1.08+0.42D) than SICS group (1.51+0.55D).

Study done by Rathi et al. in Haryana showed statistically significant difference in terms of distribution of vision, phaco group had better visual outcome during 1st and 7th post-operative days but the difference between the two groups equalized after 1 month as no significant difference was noticed.[29]

In the current study, the intraoperative complications in phaco group were 4% and it was 6.5% in SICS group and post-operative complications in phaco group was 4.5% and 8.5% in SICS group. There was no statistically significant difference in the distribution of intraoperative and post-operative complications between Phaco with rigid IOL and SICS groups. Two cases in each group had PCR with ACIOL (6 mm) implantation after doing anterior vitrectomy.

Our results are consistent with the study by Tyagi et al.,[25] who did not show a statistically significant difference in the distribution of intraoperative and post-operative complications between the phacoemulsification and SICS groups.

On the other hand, a study by Devendra et al.[26] found fewer complications in SICS than patients in the phacoemulsification group. Ramalakshmi et al. reported 4% incidence in phaco group and 10% in SICS group.[30]

Limitations of the study

The study sample size was small. Follow-up was recorded up to 6 weeks, after which patients were not followed for late post-operative complications such as posterior capsular opacity and changes in final visual outcome. There was no correlation between corneal thickness and endothelial cell count after surgery.

CONCLUSION

SICS has comparable effectiveness as phacoemulsification with rigid IOL, in terms of visual outcome. Since, phacoemulsification with foldable IOL is associated with high cost and maintenance demands of the equipment, both SICS and phaco with rigid IOL should be considered in developing countries and rural areas. Current study has proven that enlarging the clear corneal incision in phacoemulsification to implant a rigid IOL is indeed a good surgical option, as it gives lesser astigmatism as well as secure wound. Complication profile in both the groups was less and statistically not significant, boosting the fact that both SICS and phacoemulsification are equally good options to reduce the burden of blindness due to cataract among those who cannot afford phaco surgery with foldable lens in low and middle income countries. Many surgeons use a mix of cataract extraction techniques. In institutions and places where there are more number of trained phaco surgeons, vitreo retinal back up, with the availability of low cost consumables and also if there are any training programs for fellowship students and residents, then phaco will be a better option in camp surgeries in developing nations.

However, in places where there is a dearth of resources and lack of trained surgeons SICS by virtue of being fast, safe, non-machine dependent can still continue to be the preferred surgical technique to restore good visual outcome and to eliminate blindness due to cataract. Apart from clearing backlog due to cataract, India can be a global hub for both SICS and phacoemulsification delivery and training as well.

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CW- Operated all the patients belonging to the present study and drafted the manuscript; **P and PS-** compilation of the data and contributed for manuscript; **ALT, BBK, SC-** contributed for the manuscript.

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