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Original Research Article

A Questionnaire Based Qualitative Comparison in Post-Operative Patients of Mslcs and Phacoemulsification

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Abstract

Background: Post-operative patient outcome of Manual Small Incision Cataract Surgery (MSICS) and Phacoemulsification (Phaco) should focus on functional status and quality of life instead of only visual acuity measurement alone. ***Aim:*** Comparative study to evaluate functional outcome of quality of life in post-operative patients of Manual Small Incision Cataract Surgery (MSICS) vs Phacoemulsification (Phaco) using Indian visual Function Questionnaire-33. ***Design:*** A prospective, comparative hospital based interventional study was conducted on 246 eyes having visually significant senile cataract. 246 eyes were divided into two groups. 123 eyes were planned for MSICS & Phacoemulsification each at Regional Institute of Ophthalmology, Pt.B.D.Sharma PGIMS, Rohtak. A detailed pre and post-operative examination was carried out and interviewed as per IND VFQ-33 questionnaire pre-operatively and post-operatively at 1 week, 1 month and 2 months**.** ***Results****:* There was a significant difference between 2 groups in terms of Quality of Life Scores at Post-Operative Day-7.With the median QoL Score (Domain 1+2+3) at Post-Operative Day-7 being highest (87) in the SICS group as compared to Phacoemulsification (74) with p<0.001.There was no significant difference between 2 groups in terms of VR QoL Scores at Post-Operative 1 & 2 Months. Median Quality of Life Score of (Domain 1+2+3) at 1 Month was 57 in both study groups with p=0.808. Median Quality of Life Score (Domain 1+2+3) at 2 Months was 43 in both MSICS & Phacoemulsification group with p=0.636. ***Conclusions:*** The study group patients observed no difference in terms of Related Quality of Life in post-operative Manual Small Incision Cataract Surgery and Phacoemulsification especially after 1 & 2 months**.** So functionally, quality of life in post-operative 1-2 months of Manual Small Incision Cataract Surgery and Phacoemulsification are equally good.

Key words: Manual Small Incision Cataract Surgery, Phacoemulsification, Hydrophobic PCIOL Lenses, Visual outcome, surgical induced astigmatism, Vision Related Quality of Life, Questionnaire.

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INTRODUCTION

Senile cataract is 'Age-Related Cataract' and is the commonest type of acquired cataract [1]. As per WHO cataract is second most common cause of visual impairment after uncorrected refractive error. However, cataract remains the leading cause of avoidable blindness worldwide. Surgical removal is indicated when opacity develops to a degree sufficient to cause difficulty in performing essential daily activities [2, 3].

Manual small incision cataract surgery (MSICS) and Phacoemulsification both are variant of extra capsular cataract extraction surgeries (ECCE) and have evolved to be the most common cataract extraction surgeries. MSICS is significantly faster, cheaper, less technology dependent, suitable for treatment of advanced cataracts in developing world [4, 5]. Phacoemulsification is today the most popular method worldwide. The nucleus is emulsified by a phacoemulsifier and the lens is removed by suction. This technique requires a small incision and is machine dependent [6].

Cataract surgery causes improvement in visual acuity. It is also important to assess the effect of this visual improvement on patient's general and day-to-day activities as some studies suggest that decreased visual functions due to any cause is associated with decrease in quality of life and general functional living activities [7].

To compare the outcome of both the surgical interventions on visual function in terms of patient-perceived outcomes is a significant factor. To assess this improvement in quality of life, a questionnaire named Indian Visual Function Test-33(IND-VFQ-33) will be used. This questionnaire elicits problem statements describing the consequences of vision impairment in the Indian population.

The purpose of this study is to examine the effect of cataract surgery from the patient's perspective and then further comparing the improvement in the quality of life by two techniques.

Study design: This study was a prospective, comparative randomized hospital based interventional study conducted over a period of one year (February, 2019 to January, 2020) on patients undergoing cataract surgery by two methods, MSICS and phacoemulsification at Regional Institute of Ophthalmology, Pt. B.D. Sharma PGIMS, Rohtak.

Inclusion criteria All patients aged more than 40 years with age related cataract and visual acuity of 6/18 or less in one or both eyes.

Exclusion Criteria: Patients with vision impairing ocular co-morbidity, active infectious or inflammatory pathologies, any intraoperative complications, any other co-morbidity which affects quality of life, and those who were not willing to be included in the study.

Sample size was calculated using the following formula:

$$\mathbf{N= 2x\ (Z_{1-a}/2 - Z_{1-b})2\ SD^2/d^2}$$

Where, **N** = sample size of each group

Taking **Z1-a/2**=1.96 at confidence interval of 95% and **Z1-b**=0.84 at power of study 80% and
SD = Standard deviation of 5.35
d = difference in mean score assumed as 2.

N was calculated as123 for each group with 10% attrition rate. Standard deviation was taken from the study conducted by Pandey N *et al*. [8]

Out of 246 eyes, 123 eyes each were randomly selected for MSICS and Phacoemulsification. Both procedures were carried out by same surgeon and only hydrophobic type of posterior chamber intraocular lenses was implanted in every operated eye.

Pre-operative Assessment

At the initial visit, pre-operative assessment was done and each patient was interviewed as per the IND-VFQ-33 questionnaire for pre-operative baseline quality of life scores. Patients were taken up for respective surgery which included extraction of the cataract followed by implantation of posterior chamber intraocular foldable lenses in either group. After surgery, all patients were given post-operative medication. Patients were followed up on post-operative day 1, day 7, 1st month and 2nd month. QOL proformas were filled up at each visit.

The questionnaire comprised of 33 items (questions) in three domains, the general functioning domain (Domain1, 21 items with 5 responses each), the psychosocial impact domain (Domain2, 5 items with 4 responses each) and the visual symptoms domain (Domain 3, 7 items with 4 responses each) [9].

An extra response category (which scored 5) was included in the general functioning domain to reflect the respondent's inability to carry out the activity because of vision impairment. The questionnaire was read to each patient in their local language to eliminate the language bias by the same interviewer.

Response scale for three domains is as follows

Domain 1	**Domain 2**	**Domain 3**
General functioning scale	Psychosocial impact scale	Visual symptoms scale
1= Not at all	1= Not at all	1= Not at all
2= A little bit	2= A little bit	2= A little bit
3= Quite a bit	3= Quite a bit	3= Quite a bit
4= A lot	4= A lot	4= A lot
5= Cannot do this because of my sight.		

Scoring was done for each domain individually and then sum total score for all three domains was calculated and compared between 2 groups at different time intervals as discussed earlier.

STATISTICAL ANALYSIS

At the end of the study, data was compiled and recorded in MS Excel spread sheet programme. Statistical Package for Social Sciences SPSS v23 (IBM Corp.) was used for data analysis. Descriptive statistics

were elaborated in the form of means for continuous variables. Frequencies and percentages were used for categorical variables. For non-uniformally distributed data, appropriate non-parametric tests i.e, Wilcokson's Test (W) was used for group comparisons for continuous data. Group comparisons for categorical data were done by Chi-squared tests. In case the expected frequency in the contingency tables was found to be <5 for >25% of the cells in excel spread sheet, then Fisher's Exact Test was used. Paired variables which were not continuously distributed, non-parametric tests in the form of Friedman Test were used. Statistical significance was kept at $p<0.05$.

OBSERVATIONS AND RESULT

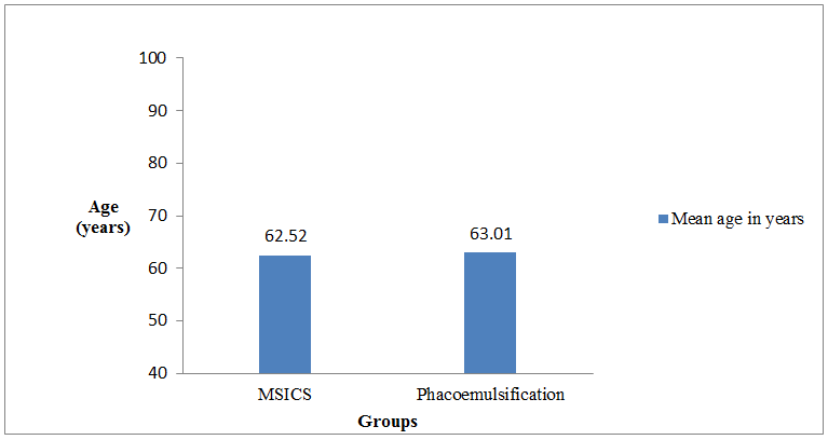
Age Distribution

The mean age in MSICS group was 62.52±8.62 years and in phacoemulsification group. It was 63.01±9.09 years with no significant difference between the groups in terms of age (years) with p=0.684 (W=7791.000).

Table-1: Comparison of MSICS group and Phacoemulsification group in terms of age (years)

Age(Years)	Group		Wilcoxon Test	
	MSICS	Phacoemulsificationn	W	P value
Mean±SD	62.52±8.62	63.01±9.09	7791.000	0.684
Median(IQR)	63(8)	65(10)		
Range	40–86	42-86		

The bar graph1below depicts mean age (years) in 2 different groups.



Gender distribution

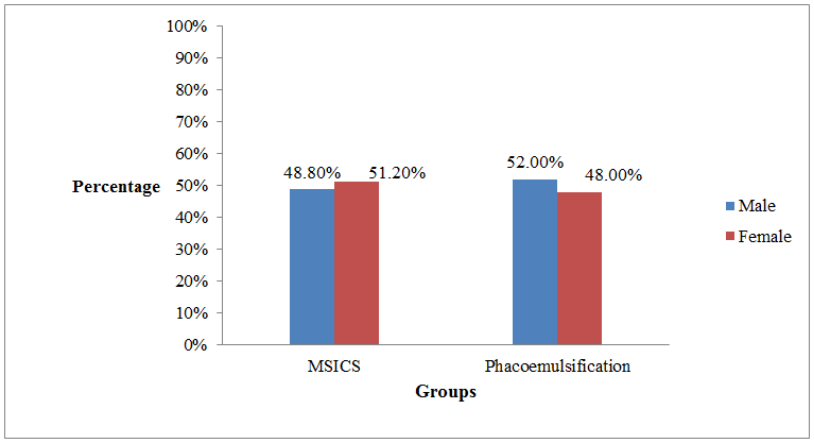
In this study, 124 (50.4%) participants were males and 122 (49.6%) were females. While in individual group, in MSICS group, 48.8% were males and 51% were females. In Phacoemulsification, 52% males and 48% females participated. Chi-squared test was used to explore the association between 'group' and 'gender'.

There was no significant difference between two groups in terms of gender distribution with p=0.610(X^2=0.260).

Table-2: Association between group and gender (n=246)

Gender	Group			Chi-Squared Test	
	MSICS	Phacoemulsification	Total	X^2	P Value
Male	60(48.8%)	64(52.0%)	124(50.4%)	0.260	0.610
Female	63(51.2%)	59(48.0%)	122(49.6%)		
Total	123(100%)	123(100%)	246(100%)		

The bar graph 2 depicts association between group and gender



Quality of life

1. Change in total QoL scores over the time in individual group

Quality of life was assessed using Indian visual function questionnaire-33. Scoring was done individually for each domain and then combined score for all three domains was calculated. Both the groups were compared in terms of the individual score for each domain and total scores as well. Intra-group comparisons were also made to assess improvement in scores after surgery.

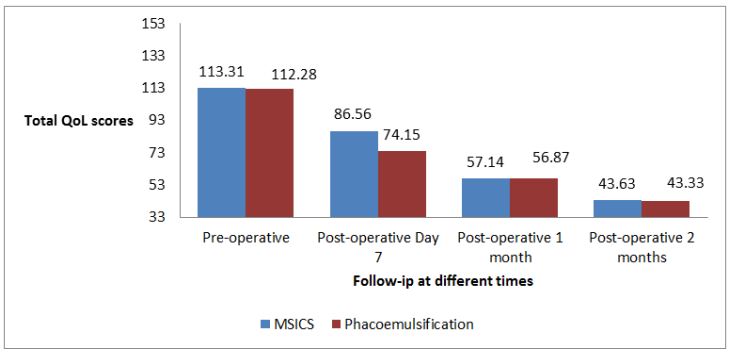
In MSICS group, the mean QoL score: Total decrease in score from a maximum of 113.31 at the pre-operative time point to a minimum of 43.63 at the 2 months post-operative time point. This change was statistically significant $p<0.001$. (Friedman Test: $X^2=369.0$).

In Phacoemulsification group, the mean QoL score:Total decreased from a maximum of 112.28 at the pre-operative time point to a minimum of 43.33 at the 2 months post-operative time point. This change was statistically significant with $p<0.001$. (Friedman Test: $X^2=369.0$).

Table-3: Comparison of the two Groups in terms of change in total score for quality of life over time (n=246)

Quality of life (QoL) Score: Total	Group				P value for comparison of the two groups at each of the time points (Wilcoxon Test)
	MSICS		Phacoemulsification		
	Mean±SD	Median (IQR)	Mean±SD	Median (IQR)	
Pre-operative	113.31±9.80	113.00 (16.00)	112.28±10.60	110.00 (14.00)	0.562
Post-operative Day 7	86.56±5.73	87.00 (8.00)	74.15±5.02	74.00 (4.00)	<0.001
Post-operative 1 month	57.14±6.79	57.00 (10.00)	56.87±5.55	57.00 (9.00)	0.808
Post-operative 2 months	43.63±3.64	43.00 (6.50)	43.33±3.48	43.00 (5.00)	0.636
P value for change in QOL Score: Total over time within each group (Friedman Test)	<0.001		<0.001		-

The bar graph 3 below depicts the change in QOL Score: Total over time in both the groups.



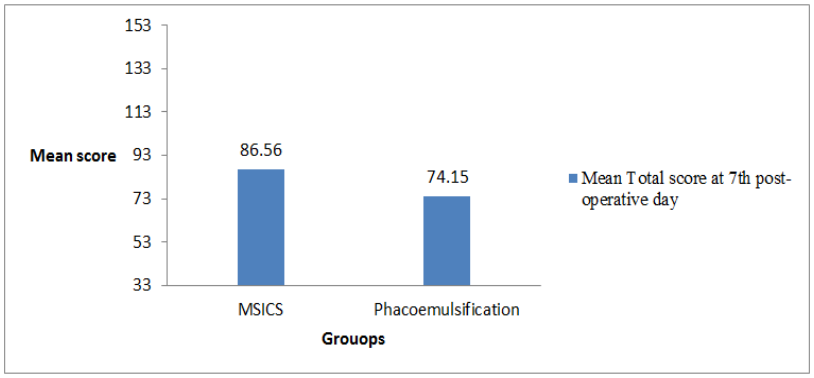
2. Comparison of total QoL scores between the groups on post-operative day 7

After comparing scores of individual domains between 2 groups, total scores were calculated and compared. There was a significant difference between the 2 groups in terms of total QoL score on post-operative day 7 with p <0.001 (W=793.500). Mean of total score in MSICS group was 86.56±5.73 and in phacoemulsification was 74.15±5.02 with the median QoL Score: Total (Post-operative day7) being highest in the MSICS group (87) and 74 in Phacoemulsification.

Table-4: Comparison of the 2 groups in terms of QoL Score: Total on post-operative day 7 (n=246)

QoL Score:	Group		Wilcoxon Test	
Total on post-operative day 7	MSICS	Phacoemulsification	W	p value
Mean±SD	86.56±5.73	74.15±5.02	793.500	<0.001
Median (IQR)	87 (8)	74 (4)		
Range	73 - 104	62 - 94		

The bar graph 4 below depicts the means of QoL Score: Total on post-operative day 7 in the 2 different groups.



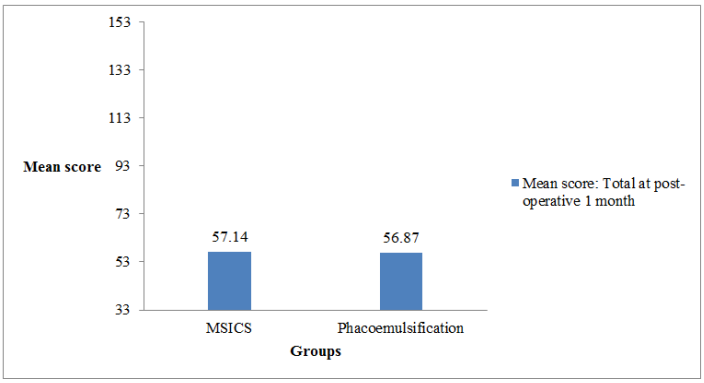
3. Comparison of total QoL scores between the groups at post-operative 1 month

There was no significant difference between the groups in terms of total scores at post-operative 1 month with p=0.808 (W=7428.500). Mean total score in MSICS group was 57.14±6.79, while that in phacoemulsification group was 56.87±5.55. The median total score was 57 in both the study groups.

Table-5: Comparison of the 2 groups in terms of QoL Score: Total at post-operative 1 month (n=246)

QoL Score:	Group		Wilcoxon Test	
Total at post-operative 1 month	MSICS	Phacoemulsification	W	p value
Mean±SD	57.14±6.79	56.87±5.55	7428.500	0.808
Median (IQR)	57 (10)	57 (9)		
Range	45 - 73	44 - 70		

The bar graph 5 below depicts the means of QoL Score: Total at post-operative 1 month between 2 groups.



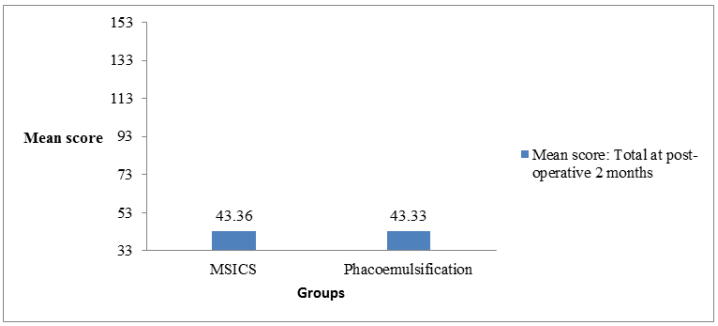
4. Comparison of total QoL scores between the groups at post-operative 2 months

There was no significant difference between the groups in terms of total scores at post-operative 2 months with p=0.636 (W=7301.000). Mean of total score in MSICS group was43.63±3.64, while that in phacoemulsification group was 43.33±3.48. The median of total score was 43 in both the study groups.

Table-6: Comparison of the 2 groups in terms of QoL score: Total at post-operative 2 months (n=246)

QoL Score: Total at post-operative 2 months	Group		Wilcoxon Test	
	MSICS	Phacoemulsification	W	p value
Mean±SD	43.363±3.64	43.33±3.48	7301.000	0.636
Median (IQR)	43 (6.5)	43 (5)		
Range	37 - 52	36 - 52		

The bar graph 6 below depicts the means of QoL Score: Total at post-operative 2 months in the 2 different groups.



DISCUSSION

In our study functionally Quality of life was better in patients of phacoemulsification at post-operative day 7; however, no differences were noticed between both the groups in quality of life scores post 1 and 2 months of surgery.

Although various studies have been conducted in past regarding improvement in visual function and vision related quality of life post cataract extraction but ours is a study comparing the results post two of the most commonly employed cataract extraction techniques. Previous studies have not compared this improvement between different techniques of cataract extraction.

After 7 days of surgery, an increase in frequency of responses like ‘a little bit’ and ‘quite a bit’ in both the groups. Following 1 month, there was an increase in frequency of response ‘not at all’, suggesting improvement in quality of life with time and increasing satisfaction level in patients. Post 7 days of surgery, 73% of the patients were not able to go out at night (question 6). This proportion increased to 80% after 1 month. More than 85% patients were satisfied and were not scared to lose their remaining vision (question 26).

One such similar study using similar questionnaire was conducted by Pandey N. *et al*., however, sample size of this study was less; i.e. 30 patients were taken in each group and follow-up interval was taken as first 15 days post-surgery. The QoL scores in each domain as well as combined total scores of all domains demonstrated a statically significant decrease from pre to post scores in MSICS and phacoemulsification with individual p<0.001 [8].

Zitha AJ *et al*., conducted a study to evaluate the impact of cataract surgery on vision related quality of life (VRQoL) for the ECCE and MSICS techniques were followed for a period of 6-weeks post-surgery. The VRQoL was assessed using the same IND-VFQ-33. There were statistically significant differences ($p<0.05$) between the pre-surgery and post-surgery mean scores for all the questions [10].

Sharma D *et al*., conducted a study to find the improvement in the general and visual quality of life after cataract surgery apart from the improvement in visual impairment. Overall vision related quality of life improved significantly ($p<0.001$). There was significant improvement in general quality of life over all five domains of mobility, self-care, usual activity, pain and anxiety/depression ($p<0.001$). Vision related quality of life was assessed using WHO/PBD VFQ 20 [11].

Alhassan MB *et al*., did a study to determine the impact of cataract surgery on Visual functions (VFs) and Quality of life (QoL). There was significant improvement in overall VF and QoL following cataract surgery ($p<0.0001$). The overall mean QoL scores were 23.7 (SD ± 9.0) pre-operatively and 13.5 (SD±1.1) postoperatively with a statistically significant difference with $p<0.0001$ [12].

Bandhu SD *et al*., had a study to evaluate the impact of cataract on the quality of life of rural patients in India and the same questionnaire had been used to assess quality of life. Patients were surveyed preoperatively and 3 months after undergoing cataract surgery. Improvement of scores was documented in each domain before and after surgery with $p<0.0001$ [13].

CONCLUSION

Quality of life had improved significantly post cataract extraction in both groups over the course of time. At 7th post-operative day quality of life was better in Phacoemulsification group possibly due to small clear corneal incisions, less intraoperative manipulation and less corneal edema. But after one month and two months of surgery, when quality of life was compared between two groups there was no significant difference. Therefore this study showed same improved functional Quality of Life in both late post operative MSICS and Phacoemulsification techniques.

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