# **Original Research Article**

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# The impact of cataract surgery upon visual acuity and quality of life in patients with cataract in Tripura

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#### **ABSTRACT**

**Background:** The major cause of blindness in India is cataract. Blindness leads to poverty due to reduced productive activity and this leads to reduced quality of life. This study was aimed at evaluating the visual acuity (VA) change pre and post cataract surgery, the post-surgical quality of life (QOL) outcomes and level of satisfaction estimation.

**Methods:** This was a cross sectional, hospital based study carried out in a tertiary care centre in Tripura. It included 200 patients over a period of 1.5 years to compare the VA, QOL, psychosocial status and satisfaction level pre and post cataract surgery. Indian vision function questionnaire 33 (INDVFQ33) was used to assess QOL.

**Results:** Out of 200 patients, in 53% preoperative VA ranged from >20/400 - <20/200 while in 5% patients it was only perception of light. Postoperatively 80% of the patient achieved best corrected VA (BCVA) of 20/30 or better, 18% patient attained BCVA ranging from 20/40 to 20/60. Only 2% had a BCVA of 20/60 or worst. QOL parameters like mean pre and post -operative general function score, psychosocial scale and visual function scale showed improvement following cataract surgery. 69% of the patients were satisfied with the cataract surgery, whereas 31% were not completely satisfied.

**Conclusions:** The study revealed that there was a marked improvement in VA post cataract surgery and it also influenced the QOL in all scales.

Keywords: Cataract, Quality of life, Visual function, Satisfaction

# **INTRODUCTION**

Cataracts are specifically defined as any opacification in one or more layers of the crystalline lens that diffracts light and causes impaired vision when an eye lens loses its clarity. The major cause of blindness in the world is cataract (33%) and approximately 45 million people are blind worldwide, out of which cataract accounts for 17.6 million (39%) cases. In India, an estimated '20 lakhs new cases of cataract is being added to the burden every year. Blindness leads to poverty due to reduced productive activity and this leads to reduced quality of life (QOL). This means reduced vision and quality of life is directly

dependent on each other.<sup>4</sup> Cataract surgery is a cost effective intervention and cataract surgical rates (CSR) have increased day by day over the past few years in many countries, including India.<sup>3</sup>

The visual improvements following cataract extraction are traditionally demonstrated clinically by changes in Snellen's visual acuity (VA) in the operated eye. The impact on function in everyday life with respect to vision-dependent activities or QOL has not often been considered as a separate issue, partly because of the presumption of improvement in VA.<sup>5</sup> It will also be inappropriate if the outcome of cataract surgery is measured only by changes

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in visual acuity without seeing its effect on improvement on quality of life. Assessment of patient satisfaction level following quality of life improvement also gives additional information on the result of surgery. Studies have found suboptimal quality of cataract surgery. 6-8

This study is aimed to address this gap and assess the cataract surgical results and the post-surgical QOL outcomes and level of satisfaction estimation.

#### **METHODS**

This was a cross sectional, Hospital based study carried out in a tertiary care centre in Tripura over a period of 1.5 years (January 2018 to June 2019) with the objective to compare VA, QOL and psychosocial status among pre and post cataract surgery patients and to analyse the difference of satisfaction level pre and post cataract surgery patient. After ethics committee approval we included patients who had cataract in both eyes but excluded others with vision threatening comorbidities. It has been conducted among 200 patients with cataract who underwent surgery at tertiary health care centre. The Indian visual function questionnaire-33 was used for assessing QOL before and 1 month after cataract surgery. All the patients underwent manual small incision cataract surgery phacoemulsification with intra ocular lens implantation. Indian vision function questionnaire 33 questions (IND VFQ 33) on visual symptoms, psychosocial impact, and general functioning scale were assessed by a four point response scale (1=not at all, 2=a little, 3=quite a bit, 4=a lot). General functioning include an extra response category (which scored 5) which reflected the respondents inability to carry out the task. Sample size has been calculated considering a change in VA by 75% (P) following cataract surgery with a level of significance at 95%. An Allowable error of 10% and a relative precision of 7.5 has been considered. Data analysis was done by statistical package for the social sciences (SPSS) 25.0 version. Descriptive statistics expressed as frequency and percentages. Chi square, t-test statistics and multiple logistic regression had been applied to assess the association between different variables. P value <0.05 was considered as significant.

# RESULTS

A total of 200 patients were interviewed before and after cataract surgery. The study showed majority of the participants were male (67%) and within the age group of 60-70 years (49%). Majority were Hindu (66.5%) by religion, 50% were general caste, 84% were married and 84% were nuclear family holder. Around 38% were primary level educated. It has been noted that 58% were from lower middle class according to B. G. Prasad classification. And almost 37% were unemployed (Table 1).

The present study revealed that visual acuity preoperatively for 5% patients were only perception of

light, In majority of the patient preoperatively VA ranged from >20/400 - <20/200. Postoperatively, 80% of the patient achieved best corrected VA (BCVA) of 20/30 or better, 18% patient attained BCVA ranging from 20/40 to 20/60, and only 2% achieved BCVA of 20/60 or worse due to operative complications like cystoid macular edema (CME) or posterior capsular rupture (PCR) (Table 2).

Table 1: Socio demographic profile.

Age (years)    <60  31    60-70  49    >70  20    Gender    Male  67    Female  33    Religion    Hindu  66.5    Muslim  10.5    Christian  16    Buddhist  7    Caste    General  50    ST  15    SC  17    OBC  18    Marital status    Married  84    Widowed  16    Family status    Nuclear  84    Joint  16    Education    Illiterate  32    Primary  38    Secondary  18    Higher secondary  6    Graduation and above  6    Employment    Housewife  27    Unemployed  37    Unskilled  13    Skilled  7    Business <td< th=""><th>Characteristics</th><th>Frequency</th></td<>	Characteristics	Frequency
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I		
, ,	Lower middle (938-1875 Rs.)	52
Lower (<938 Rs.) 22	Lower (<938 Rs.)	22

IND VFQ 33 was used for evaluation of quality of life change in the patients. The present study revealed that the

post-operative mean score in all the three aspect of IND VFQ 33, general, visual and psycho-social function was significantly lower than the preoperative score (P<0.000) suggesting a significant improvement in QOL after surgery (Table 3). The average pre-operative and post-operative QOL scores were compared using paired t test and improvement was found to be statistically significant in all parameters (P=0.000) (Table 4).

Table 2: Visual acuity changes pre and post cataract surgery.

BCVA	Frequency
Pre-operative	
PL only	5
<20/400	19
>20/400	53
>20/200	23
Post-operative	
<20/60	2
20/40-20/60	18
20/30	44
20/20	36

Taking mean of total post-operative score as cut of, out of total 200 patients, majority means 69% of the patient were satisfied with the cataract surgery, where 31% of the patient were not completely satisfied (Figure 1).

Association of socio-demographic factors like age of the patient, patient's community/caste, education status and occupation was statistically significant with satisfaction level following cataract surgery (Table 5).

Multiple logistic regression analysis has been done to see the variables associated with satisfaction level and it shows that patients age >70 years and within age group of 60-70 years are having 9 times and 2 times more satisfaction level after cataract surgery compared to those <60 years of age. Similarly patients who studied till primary level and studied up to graduation and above is more satisfied than illiterate patient. Unemployed, unskilled and skilled workers are more satisfied than housewives and scheduled caste (SC), scheduled tribe (ST) and other backward classes (OBC) patients are more satisfied than general patients (Table 6).

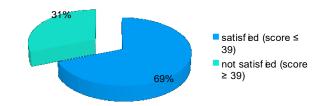


Figure 1: Distribution of satisfaction by taking mean as cut off.

Table 3: The preoperative and postoperative scores of IND-VFQ33 general functioning scale, visual function scale and psychosocial impact scale.

CI.		Mean±SD	Mean±SD		
Sl no.	Problems/difficulties	Pre-operative	Post-operative		
1	Problem in climbing stairs	3.23±0.721	1.07±0.256		
2	Problem in walking on road	2.81±0.69	1.11±0.314		
3	Problem in seeing animals/vehicle on road	2.72±0.65	1.14±0.376		
4	Problem in finding new places	2.95±0.86	1.10±0.301		
5	Problem in going for social functions	3.19±0.94	1.23±0.422		
6	Problem in going out at night	2.98±0.85	1.13±0.392		
7	Problem indoors	2.32±0.59	$1.14\pm0.348$		
8	Problem seeing steps of bus	2.28±0.84	1.10±0.301		
9	Difficulty recognizing people from distance	3.85±0.901	1.17±0.427		
10	Difficulty recognizing people from near	2.17±0.568	1.15±0.410		
11	Problem in using a lock	2.41±0.803	1.10±0.301		
12	Problem doing usual work	2.37±0.596	1.14±0.449		
13	Problem doing work up to usual standard	2.55±0.867	1.05±0.218		
14	Problem in searching things at home	2.23±0.735	1.13±0.337		
15	Problem in seeing in the sunlight	3.05±1.223	1.14±0.348		
16	Problem in seeing indoors after being outdoor	2.18±0.640	1.15±0.410		
17	Problem in seeing colors	2.17±1.315	1.16±0.368		
18	Problem in making out coins, notes	1.85±1.092	1.10±0.361		
19	Problem in going for toilet	1.86±0.618	1.15±0.358		
20	Problem in seeing objects fallen in food	2.74±0.74	1.06±0.238		
21	Problem in seeing level of liquid in a container	3.20±1.089	1.14±0.402		
22	Do you have reduced vision?	3.21±0.767	1.17±0.427		
23	Are you dazzled in bright light?	1.52±0.902	1.40±0.491		

Continued.

Sl no.	Duchlama/Aifficulties	Mean±SD	
51 110.	Problems/difficulties	Pre-operative	Post-operative
24	Is your vision blurred in sunlight?	2.65±1.111	1.25±0.434
25	Does bright light hurt your eyes?	2.57±0.877	1.21±0.455
26	Do you close your eyes because of light from vehicles?	3.00±0.777	1.30±0.459
27	Does light seem like stars?	2.98±0.85	1.26±0.504
28	Do you have blurred vision?	2.98±0.649	1.18±0.434
29	Feel frightened to go out at night	2.76±0.696	1.17±0.402
30	Enjoy social functions less	2.63±0.858	1.26±0.578
31	Ashamed that you cannot see	2.24±0.983	1.40±0.567
32	Feel you are a burden on others	2.61±0.762	1.42±0.605
33	Frightened that you may lose remaining vision	2.40±0.862	1.32±0.599

Table 4: Average score and paired t test result of pre-operative and post-operative QOL scores.

Scale	Pre-operative QOL score	Post-operative QOL score		Mean	Standard deviation	T test value	P value
General functioning scale	55.11±10.06	23.66±3.47	Pre operative-post operative, general functioning scale	31.45	10.31	43.139	0.000
Visual function scale	18.86±3.63	8.77±1.65	Pre operative-post operative, psychosocial impact scale	5.97	3.54	23.85	0.000
Psychosocial impact scale	12.64±3.54	6.67±2.14	Pre operative-post operative, visual function scale	10.09	3.74	38.12	0.000

Table 5: Socio-demographic factors associated with satisfaction level following cataract surgery.

Variables	No. of	Satisfaction level		Chi square/Fisher	P
Variables	participants	Satisfied	Unsatisfied	exact value	value
Age (years)					
<60	62	34 (54.8)	28 (45.2)		
60-70	98	70 (71.4)	28 (28.6)	10.870	0.004
>70	40	34 (85)	6 (15)		
Sex					
Male	134	94 (70.1)	40 (29.9)	0.251	0.617
Female	66	44 (66.7)	22 (33.3)	0.231	0.017
Religion					
Hindu	133	94 (70.7)	39 (29.3)	_	
Muslim	21	14 (66.7)	7 (33.3)	0.899	0.826
Christian	32	20 (62.5)	12 (37.5)	0.099	
Buddhist	14	10 (71.4)	4 (28.6)		
Community					
General	100	73 (73)	27 (27)	_	0.005
ST	30	22 (73.3)	8 (26.7)	12.883	
SC	34	27 (79.4)	7 (20.6)	12.003	0.003
OBC	36	16 (44.4)	20 (55.6)		
Marrietal status					
Married	168	118 (70.2)	50 (29.8)	0.752*	0.386
Widowed/single	32	20 (62.5)	12 (37.5)	0.732	0.580
Participants education level					
Illiterate	65	46 (70.8)	19 (29.2)		
Primary	75	58 (77.3)	17 (22.7)	7.628*	0.006
Secondary	36	20 (55.6)	16 (44.4)	7.020	0.000
Higher secondary	12	8 (66.7)	4 (33.3)		

Continued.

Variables	No. of	Satisfaction level		Chi square/Fisher	P
variables	participants	Satisfied	Unsatisfied	exact value	value
Graduation and above	12	6 (50)	6 (50)		
Participant's occupation					
Housewife	54	42 (77.8)	12 (22.2)		
Unemployed	74	58 (78.4)	16 (21.6)		
Unskilled	26	18 (69.2)	8 (30.8)		0.001
Skilled	14	6 (42.9)	8 (57.1)	20.790	0.001
Business	22	8 (36.4)	14 (63.6)		
Service holder	10	4 (40)	6 (60)		
Family structure					
Nuclear	34	22 (64.7)	12 (35.3)	0.353*	0.552
Joint	166	116 (69.9)	50 (30.1	0.333	
SES (B.G. Prasad scale)					
Upper class (>6254 Rs.)	3	1 (33.3)	2 (66.7)		0.224
Upper middle (3127-6253 Rs.)	11	9 (81.8)	2 (18.2)		
Middle (1876-3126 Rs.)	38	26 (68.4)	12 (31.6)	5.330	0.234
Lower middle (938-1875 Rs.)	104	76 (73.1)	28 (26.9)		
Lower (<938 Rs.)	44	26 (59.1)	18 (40.9)		

Table 6: Multiple logistic regression analysis showing variables associated with satisfaction after cataract surgery.

Variables	P value	Odds ratio	95% CI			
Age of the patient (years)						
<60	-	-	-			
60-70	0.003	4.667	1.714-12.765			
>70	0.099	2.267	0.857-5.963			
Patient's education level						
Illiterate	-	-				
Primary	0.076	9.104	0.797-104.054			
Secondary	0.401	2.572	0.284-23.286			
Higher secondary	0.584	1.710	0.251-11.628			
Graduation and above	0.070	0.074	0.004-1.236			
Patient's occupation						
Housewife	-	-	-			
Unemployed	0.030	0.078	0.008784			
Unskilled	0.089	0.131	0.013-1.367			
Skilled	0.066	0.147	0.019-1.134			
Business	0.484	2.229	0.236-21.028			
Service holder	0.365	2.626	0.325-21.193			
Community						
General	-	-	-			
ST	0.001	0.152	0.048-0.479			
SC	0.011	0.120	0.023-0.618			
OBC	0.001	0.108	0.027-0.423			

# **DISCUSSION**

The VA gain following modern day cataract surgery has been well established. The effect of cataract surgery in terms of bringing about change in the QOL as well as general and functional wellness is being investigated. This study demonstrated a significant improvement in QOL following cataract surgery. Our study included 200 patients with visual impairment due to cataract and an attempt was made to evaluate the impact of cataract

surgery on the quality of life of the subjects. Majority of our study subjects (69%) were above 60 years of age and about 33% had no formal education which may explain the general lack of awareness and late presentation. Similar findings were noted in studies from Maharashtra where the mean age of the patients was 62.46 years and 63.13 years. These findings have been emulated in other studies from developing countries. However Conner-Spady et al reported the mean age of patients in Canada to be 73.4 years.

In our study majority (67%) subjects were male which is comparable to studies done in Orissa, North western Nigeria and Tanzania.<sup>13</sup> The higher number of male patients could be due to gender bias in seeking healthcare, high cost of surgery, lack of household economic control by the women, or may just be that there was more male attendance in the hospital. Gender inequity in use of cataract surgical services persists in the low- and middle-income countries. It has been estimated that blindness and severe visual impairment from cataract could be reduced by around 11% in the low- and middle-income countries if women were to receive cataract surgery at the same rate as men. Hence additional global efforts are needed to ensure that women receive the benefits of cataract surgery at the same rate as men.

A large majority of the patients (98%) who underwent surgery had a good visual outcome which is consistent with findings from other studies. In These results were however better than that noted in a few other studies. In our study Pre-operatively 72% of subjects had VA<20/200, 23% had VA>20/200 and 5% had visual acuity of PL only. This was slightly different from another Indian study from Maharashtra where 100% patients presented with VA<20/200. Our study noted around 23% subjects were legally blind (VA<20/400 in the better eye) at the time of presentation. This number was higher than the 11.5% legally blind subjects at presentation noted in another study from Nepal. In the study from Ne

Reduction in VA results in reduction of QOL across all parameters. This was aptly demonstrated in a study from South India.<sup>17</sup> There is a stigma attached to patients who may be visually impaired. Hence there is a tendency among the visually impaired to deny the extent to which they may be facing difficulty in their day to day activities. In our study, a majority of the patients (69%) said they had a little to no difficulty finding their way indoors. This tendency was also noted in a study from Egypt that concluded that even patients with profound visual loss do not perceive themselves to be visually disabled.<sup>18</sup>

Visual function denotes the ability to carry out activities which depend on eyesight including domestic chores, personal care and mobility. Visual function include questions about reduced vision, dazzling in bright light, blurred vision in sun light, whether sunlight hurt eyes, light seems like stars or not and all those parameters when compared there was significant improvement in mean postoperative score. The visual impairment from cataract was associated with decreased overall visual function and all other parameters were also depressed with cataract visual loss. Activities of daily living were mostly affected, as selfassessed by the patient. This was also reported in Nigeria's national blindness and low vision survey where visual function scores and all visual function subscales were lower with increasing levels of vision loss. This revealed the level of visual disability cataract patients cope with and this is enough justification for intervention.<sup>19</sup>

A significant improvement was seen in daily activities such as climbing up stairs, walking in the road, finding new places, going to social functions, going out at night, recognizing faces at near as well as distance, locking and unlocking doors or manoeuvring in new environment following cataract surgery. This improvement would result in greater confidence by patients for performing their day to day activities. Cataract surgery can prevent reduced autonomy and delay dependency situations.

Visual impairment due to cataract is known to be associated with depression.<sup>20,21</sup> Even though we did not investigate prevalence of depression in our patients, we did however note changes in psychosocial parameters. Majority of our study subjects (81%) acknowledged being frightened to go out at night while 76% admitted that they are unable to enjoy social functions due to their poor vision. About half of the study subjects (49%) conceded that they felt ashamed of themselves due to their visual disability. These parameters showed marked improvement following cataract surgery. The impact of cataract surgery on psychological distress has been investigated before in a randomized controlled trial from Australia.<sup>22</sup> It was noted that improvements in psychological distress after uncomplicated cataract surgery were associated with fewer difficulties with reading and fine handwork at follow up. Similar improvements in psychosocial parameters were also noted in a previously mentioned study from Maharashtra, India where the authors noted significant changes post cataract surgery irrespective of their gender, age group, literacy and level of preoperative visual impairment.

The present study revealed that cataract surgery improved the vision related quality of life with respect to general functioning scale, visual function scale and psychosocial scale significantly which is similar to the results of a study from Maharastra.<sup>23</sup> Similarly a prospective study was done by Sharma et al. On 231 patients using WHO/PBD VF 20 and Euro Qol (EQ-5D) questionnaire respectively. The proportion of people with a VA of >20/200 increased from 10.8% to 85.8%. Not only vision related quality of life improvement was significant (P<0.001) but also significant improvement in general quality of life over all 5 domains: mobility, self-care, usual activity, pain and anxiety (P<0.001) was seen. 9 Although studies from other developing countries have used different scoring systems in the past, results similar to our findings have been noted.23

Several studies have found poverty to be a barrier to accessing cataract surgery services in India and elsewhere. 25-27 In addition, poor surgical outcomes are very likely to discourage acceptance of available cataract surgery services. 28,29 We obtained important positive outcomes of cataract surgery in this study. Hence increased efforts are needed to encourage greater acceptance of cataract surgery services. These services should ideally be of high quality and provided regularly by the same

provider in the same locality, and customized to the needs of all sections of the society.

Cataract surgery is effective for improving eyesight and functions related to quality of life. There have been studies which utilize the quality of life measure as an instrument for choosing appropriate therapy in conditions other than cataract.<sup>30</sup> It may be considered important to include the improvement of quality of life of patients in the therapeutic and diagnostic algorithms of ophthalmic practitioners as well as in assessing the success of the results. This study aims at a comprehensive attention to patients, evaluating not only clinical improvement but also an enhancement in the quality of their lives.

#### Limitations

The study has been conducted at a tertiary care centre where the facilities are expected to be better than district and sub divisional hospitals. Hence the quality of life of post cataract surgery patients in a tertiary care hospital cannot be generalized for the patients undergoing cataract surgery elsewhere.

#### **CONCLUSION**

The study revealed that there was a marked improvement in VA post cataract surgery and it also influenced the QOL in all scales. With its high success rate and cost effectiveness, it is likely that increasing the rate of cataract surgery may contribute immensely towards enhancing the QOL of patients with visual impairment due to cataract. This study helps us understand the significance of QOL measures which may be used as an instrument in making early diagnosis for therapeutic purposes. This would go a long way in protecting the right to sight of those affected with cataract and also improve the social and health dimensions of those individuals.

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