

Visual function and quality of life amongst patients with cataract attending Ophthalmology camps in a coastal district in Southern India

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Abstract

Introduction: Aim of the study was to measure the visual function and quality of life amongst cataract patients attending camps.

Methodology: A cross sectional study was conducted among patients attending Ophthalmology camp and having impaired vision due to cataract. This study was approved by the Institutional Ethics Committee. After obtaining informed consent, validated questionnaires developed by Aravind Eye Hospital, to measure the Visual functioning (VF) and Quality of Life (QOL) were administered to the patient.

Results: A total of 324 patients (201 males and 123 females) with mean age 54.33 years (SD=8.99) were interviewed. Nearly half (46.9%) of the patients had severe or grade IV visual impairment as per WHO criteria of visual impairment. Two-thirds participants admitted that impaired vision adversely affected activities of daily living. The various sub scales studied in QOL questionnaire were: self care, mobility, social and mental problems due to impaired vision. All of these were almost equally affected due to cataract. Total VF score differs significantly ($p < 0.0005$) for various visual impairment categories, except between category 2 and 3, where there is no significant difference ($p = .695$). In the QOL score there exists significant difference ($p < 0.0005$) between group 1 with respect to other groups of visual impairment. VF & QOL score had no statistically significant association with age, gender and socioeconomic class.

Conclusion: The visual function score and the quality of life score worsen as the visual acuity deteriorates due to cataract. Hence we need to strengthen our outreach programs so that we diagnose and treat cataract early leading to better quality of life.

Keywords: Visual function, Quality of life.

Introduction

The extent of vision loss is clinically assessed by visual acuity, however, different people with same level of visual impairment may function quite differently.¹ Functional vision is defined as the vision that can be used to perform tasks using sight.¹ Hence it is vital to know how vision loss affects a person's ability to perform various activities of daily life and quality of life in turn. Cataract is one of the leading causes of diminished vision in India. Health related quality of life in a person suffering from cataract is affected adversely. This may be due to several reasons – extending from distress of diagnosis, fear of surgery, repeated hospital visits and associated expenditure besides limited mobility and dependency on others. To understand the burden of cataract on society, it is important to assess functional vision and quality of life of these patients and not just visual acuity. This will also help to know the patient's priorities as well as to plan treatment and rehabilitation. This assumes greater significance in developing countries like India where the cataract burden is high and resources scarce.²

Several health related quality of life questionnaires are in use for ocular diseases. The study aimed to determine the visual function and quality of life (QOL) among individuals with impaired vision due to cataract, using a validated questionnaire developed at Aravind Eye Institute, India. It was planned to assess the relationship of vision impairment with vision function

as well as quality of life amongst patient diagnosed with cataract.

Materials and Methods

The study was undertaken in the field practice area of a teaching hospital in the coastal town of India actively involved in eliminating cataract related blindness. In cataract screening camps held at peripheral areas, the patients diagnosed with cataract and having operable opacification were brought to the base hospital, evaluated and operated.

In this cross-sectional study, purposive sampling was followed. All individuals presenting to eye camps, aged 40 years and above with impaired vision due to cataract were included. Patients having cataract with visual impairment of acute onset either of infective or traumatic etiology were excluded. Patients having any co-morbid conditions or chronic diseases that can impair the mobility, self-care, social or mental functions were also excluded from the study. The sample size was calculated, based on 50% prevalence rate of cataract at 95% confidence interval, 10% allowable error and 90% power of study. It was calculated to be 324 using the formula $Z \alpha 2 pq/d$ 2 (where $Z = 1.96$ for 95% confidence interval, $p =$ prevalence in decimals, here $50\% = 0.5$, and $q = 1-p = 0.5$, $d =$ allowable error). Non-random, incidental (convenience) sampling was used to recruit patients for the study. The prospective participants were explained about the purpose and methodology of the study and a

written informed consent was taken. Then the visual function and QOL questionnaire was administered by the investigator. Visual acuity was assessed using Snellen's vision chart in a well illuminated room at a distance of six meters. This was followed by a basic eye examination done by an Ophthalmology resident and Ophthalmologist.

The operational definitions considered for the purpose of this work are mentioned below. Visual impairment for this study is defined and classified as per World Health Organization classification. No visual impairment in the study is defined as vision of 6/18 or better, while grade 1 is vision of 6/18 to 6/60 in the better eye. Visual acuity of 6/60 to 4/60 is defined as grade 2 while grade 3 refers to vision of 4/60 to 2/60. Grade 4 represents vision of counting finger or worse, while grade 5 represents no perception of light. Socio economic classification of respondents was calculated as per Kuppaswamy's modified classification criteria.⁷

Study tools used were visual functioning (VF) and Quality of Life (QOL) Questionnaires developed at the Aravind Eye Hospital, Madurai, India.⁶ These two questionnaires have been validated for use in India and have been extensively used in developing countries in Asia.³⁻⁵ The VF and QOL were scored as per the protocol and instructions given by the authors of the instruments. A four-point rating scale was scored and cumulative total of individual item responses expressed as percentages was calculated for each subscale. The overall VF and QOL scale scores were calculated by aggregating across all items in each scale. Scales were calibrated between 100 ('best' possible score) and 0 ('worst' possible score).

Data was tabulated using Microsoft excel and statistical analysis was done using SPSS version 11.5. Test of significance using the chi square test was carried out to determine the association between various factors and VF and QOL. P value <0.05 was considered significant. One way Anova with Bonferroni multiple comparison test was used to find association between mean vision function and quality of life score and age, gender and socio economic class.

Result

A total of 324 patients (201 males and 123 females) were interviewed. The mean age of respondents was 54.33 years (SD=8.99), with age ranging from 40 to 80 years. Majority of them were illiterate (41.7%), 30.6% were not currently employed and 94.1% of respondents were married. The participants who were belonging to upper lower class as per Kuppaswamy's classification were 67.6%.

Nearly half (46.9%) of the patients has severe or grade IV visual impairment⁴ as per WHO criteria of visual impairment, followed by category 1 impairment seen amongst 26% patients. 61(18.8%) presented with

vision of 6/60 to 4/60, while 27 (8.3%) of those interviewed had vision of 4/60 to 2/60.

The gender distribution of visual impairment of various age groups was almost equal. Mean age differed significantly ($p=.021$) between visual category 2 and 4. There is no significant difference between mean ages in other visual impairment groups. There is no significant difference between age ($p=.064$) and gender ($p=.568$) as per category of visual impairment. (Table 1)

The responses to questions on Visual Function questionnaire are tabulated in Table 2. Overall greater than one third admitted that their impaired vision has adversely affected activities of daily living with most of them requiring help to perform these activities. More than half (55%) the respondents felt that their vision was not good. More than two third of respondents admitted that their daily activities were limited due to poor sight. One third of respondents had unacceptable peripheral vision. Nearly 43% of patients had difficulty in depth perception leading to difficulties in day to day life activities.

Responses regarding Quality of life questionnaire are presented in Table 3. The various sub scales studied were regarding self care, mobility, social and mental problems due to impaired vision. All of these were almost equally affected due to cataract.

Table 4 represents the mean Visual function and quality of life score and sub scales scores in different categories of visual impairment. In the study the visual function and quality of life have a significant linear relationship with visual impairment, meaning that greater visual impairment was associated with lower visual functioning.

Total Visual function score differs significantly ($p<0.0005$) for various visual impairment categories, except between category 2 and 3, where there is no significant difference ($p=.695$).

In the Quality of life score there exists significant difference ($p<0.0005$) between group 1 with respect to other groups of visual impairment. There was an inverse linear relationship between age and Quality of life score ($R= -0.025$) but was not statistically significant.

The distribution of the mean Visual function and quality of life score and sub scales scores amongst various age groups and gender is depicted in Tables 5 and 6 respectively.

Visual function and quality of life score had no statistically significant association with age ($p=0.998$ and $p=0.787$ respectively) and gender ($p=0.703$ and $p=0.523$ respectively). Anova for Socioeconomic class shows total visual function score do not differ significantly with respect to the class ($p=0.5$). Quality of life score also does not differ significantly ($p=.334$) with respect to Socioeconomic class.

Table 1: Age and gender wise distribution of Visual impairment among the study population

Age(years)/ Visual Impairment	1		2		3		4		Total
	M	F	M	F	M	F	M	F	
40-50	12(15.6)	5(13.5)	17(22.1)	8(21.6)	12(15.6)	5(13.5)	36(46.8)	19(51.4)	114
51- 65	23(21.9)	17(23.6)	12(11.4)	10(13.9)	9(8.6)	6(8.3)	61(58.1)	39(54.2)	177
66-80	5(26.3)	4(28.6)	NIL	1(7.1)	1(5.3)	2(14.3)	13(68.4)	7(50)	33
Total	40	26	29	19	22	13	110	65	324

Table 2: Response to visual function questionnaire (n=324)

Q No	Question	Responses			
		Very Good 58(17.9)	Good 88(27.2)	Fair 99(30.6)	Poor 79(24.4)
1.	In general would you say your vision(with glasses if you wear them)is:				
	Question	Not at all	A little	Quite a lot	A lot
2.	To what extent your sight limits you in your daily activities?	39(12)	66(20.4)	115(35.5)	104(32.1)
3	How much problem do you have recognizing people across the street?	32(9.9)	69(21.3)	105(32.4)	118(36.4)
4.	How much problem do you have recognizing the face of the person standing near you?	16(4.9)	106(32.7)	104(32.1)	98(30.2)
5.	How much problem do you have recognizing smaller minute objects (such as grains or the lines in your hand)?	42(13)	75(23.1)	116(35.8)	90(27.8)
6.	When you are walking along how much problem do you have noticing objects off to the side?	92(28.4)	119(36.7)	68(21)	45(13.9)
7a.	How much problem do you have adjusting to darkness after being in bright light?	121(37.3)	108(33.3)	76(23.5)	19(5.9)
7b.	How much problem do you have adjusting to brightness after being in dark place?	102(31.5)	100(30.9)	97(29.9)	25(7.7)
8.	How much problem do you have locating something when it is surrounded by a lot of other things (like finding a specific food item on your plate)	32(9.9)	163(50.3)	71(21.9)	58(17.9)
9.	How much problem do you have in recognizing colors?	73(22.5)	106(32.7)	74(22.8)	71(21.9)
10.	When you reach for an object (example to take a glass) how much problem do you have in finding it, because it is further away or closer than you thought?	35(10.8)	149(46)	103(31.8)	37(11.4)
11a.	How much problem do you have in recognizing a person when you are in a bright light?	80(24.7)	107(33)\$	123(38)	14(4.3)
11b.	How much problem do you have seeing with bright light shining on your face (such as from a oncoming bus or car)?	66(20.4)	101(31.2)	110(34.0)	47(14.5)

Table 3: Responses of quality of life questionnaire (n= 324)

Response		Not at all	A little	Quite a bit	A lot
Activity					
Self care How much problem do you have because of your vision in	Bathing	36(11.1)	152(46.9)	89(27.5)	47(14.5)
	Eating	126(38.9)	124(38.3)	54(16.7)	20(6.2)

doing the following activities unaided?	Dressing	93(28.7)	141(43.5)	80(24.7)	10(3.1)
	Toileting	32(9.9)	130(40.1)	72(22.2)	90(27.8)
Mobility How much problem do you have because of your vision in doing the following activities unaided?	Walking to neighbors	12(3.7)	93(28.7)	87(26.9)	132(40.7)
	Walking to shops	11(3.4)	97(29.9)	87(26.9)	129(39.8)
	Doing your usual household chores	11(3.4)	97(29.9)	87(26.9)	129(39.8)
Social Because of your usual problem do you feel less inclined to participate in the following?	Attending social functions like weddings, funerals, festivals	11(3.4)	97(29.9)	87(26.9)	129(39.8)
	Meeting with friends and relatives	11(3.4)	97(29.9)	87(26.9)	129(39.8)
Mental Because of your vision problems do you feel any of following?	A burden on others	69(21.3)	143(44.1)	88(27.2)	24(7.4)
	Dejected	85(26.2)	95(29.3)	141(43.5)	3(0.9)
	Loss of confidence in doing usual activities	75(23.1)	168(51.9)	79(24.4)	2(0.6)

Table 4: Vision function and Quality of life scale scores by category of visual impairment

	Visual impairment category	1 n = 84	2 n = 61	3 n=27	4 n=152
		Mean (S.D)	Mean (S.D)	Mean (S.D)	Mean(S.D)
VISION FUNCTION	General	34.82 (13.45)	65.98(21.91)	67.59 (20.59)	81.58 (17.439)
	Visual perception	54.54 (15.32)	72.85(16.53)	69.21 (14.70)	81.54 (11.128)
	Peripheral vision	33.04 (14.08)	53.28(21.64)	62.96 (17.50)	66.61 (24.234)
	Sensory adaptation	39.51 (8.79)	61.58(10.88)	61.81 (14.01)	72.66 (11.437)
	Depth perception	55.95 (21.12)	57.38(17.88)	54.63 (20.84)	66.28 (20.599)
	Total	45.76 (7.8)	61.27(10)	62.15 (10.53)	71.77 (10.41)
QUALITY OF LIFE	Self-care	46.21(9.94)	58.09 (10.42)	61.11 (11.28)	60.94 (11.58)
	Mobility	74.18 (17.18)	79.07 (15.7)	77.44 (16.14)	75.24 (16.67)
	Social	72.62(23.80)	80.74 (22.54)	76.85(20.72)	75.33 (22.65)
	Mental	52.86 (13.47)	54.08 (14.40)	54.61 (13.54)	53.43 (13.30)
	Total	61.46 (11.42)	67.99 (9.54)	67.50 (10.73)	66.24 (10.73)

Table 5: Vision function and Quality of life score by category of age

Category	40-50 years n = 114	51-65 years n= 177	66-80 years n=33	Overall mean
Vision function	Mean (SD)	Mean (SD)	Mean (SD)	
General	66.23(25.543)	65.54(26.492)	61.36(25.838)	65.35(26.053)
Visual perception	72.70(16.573)	71.93(17.891)	68.75(19.453)	71.87(17.585)
Peripheral vision	56.14(25.883)	53.39(24.624)	60.61(25.024)	55.09(25.137)
Sensory adaptation	61.24(17.003)	60.95(17.759)	61.17(17.382)	61.07(17.406)
Depth perception	59.21(21.622)	62.57(20.318)	58.33(20.412)	60.96(20.808)
Total	62.322(14.1777)	62.209(14.5000)	62.216(15.0654)	62.249(14.4005)
Quality of life				
Self care	55.9211 (10.24594)	56.2853 (13.51519)	60.6061(14.01771)	56.59(12.55)
Mobility	76.5045 (17.71626)	75.8171 (15.71211)	73.9603(17.51747)	75.86(16.59)
Social	77.85 (23.224)	74.72 (22.454)	74.24(23.787)	75.57(22.84)
Mental	53.7066 (13.16352)	53.8862(13.72899)	50.7373(13.71349)	53.4(13.52)
Total	65.9957 (11.077492)	65.17653(10.626588)	64.88652(12.252580)	65.43(10.93)

Table 6: Vision function and Quality of life score by gender

Category	Male n = 201	Female n = 123
Vision Function	Mean(SD)	Mean(SD)
General	65.55(25.327)	65.04(27.300)
Visual perception	70.93(17.841)	73.42(17.118)
Peripheral vision	53.61(24.926)	57.52(25.393)
Sensory adaptation	61.94(17.878)	59.65(16.579)
Depth perception	61.57(21.935)	59.96(18.866)
Total	62.010(14.7585)	62.640(13.8460)
Quality of life		
Self care	56.8719(13.31712)	56.1484(11.23131)
Mobility	76.5448(17.48125)	74.7668(15.02520)
Social	76.49(23.670)	74.59(21.469)
Mental	53.0468(13.56993)	54.2466(13.46411)
Total	65.73900(11.507979)	64.93882(9.945368)

Discussion

This study provides a description of vision impairment due to cataract and its effect on visual functioning and vision related quality of life in a coastal district in Karnataka. The study population comprised of patients attending cataract screening camps. Previous such studies have been carried out as population based study.¹ However, this study has employed incidental (convenience) sampling whereas similar such studies previously conducted have used cluster sampling.^{1,3}

A study on Vision-Specific Instruments for the Assessment of Health-Related Quality of Life and Visual Functioning concluded that many vision-specific self-report instruments have been developed since 1998 in response to the numerous research activities in Ophthalmology. Three instruments, the ADVS, VFQ-25, and VF-14, have been well validated and widely used among patients with various ocular disorders. The importance of assessing the impact of visual impairment on patient functioning and HR-QOL has gained acceptance in recent years. There is growing awareness that the full benefits of new treatments may go undetected unless visual instruments are carefully designed to measure appropriate and relevant patient outcomes.⁸

The questionnaires used in the present study has been developed and validated for a clinical trial of cataract surgery at the Aravind Eye Hospital⁽⁶⁾ in the context of large volume surgery in a developing country. Both of these questionnaire have been successfully used in Andhra Pradesh in assessing impact of visual impairment and eye disease on visual function⁽¹⁾ and in evaluating cataract outcome survey in Nepal, China and Hong Kong.³⁻⁵

Our study demonstrates that visual function and quality of life seem to have a linear relationship with visual impairment. This finding is consistent with previous reports.^{1,4}

This study did not show marked variation amongst various age groups and gender. While in another study done on patients operated for cataract, visual function had statistically significant association with gender ($p=0.02$), but not with age ($p=0.09$) and education ($p=.52$).⁴ This could be because of small sample size as compared to large population based studies which have been done earlier.

As the study population reports to camps voluntarily and the surgery which is done for them is free or at a subsidized rate, hence there is a possibility of these patients misreporting the extent of their disability.

In a study in Andhra Pradesh, regarding, relationship between visual impairment and eye diseases and visual function, the Visual Function Questionnaire was shown to be a measure of vision function across a range of visual problems among older adults in Andhra Pradesh. Presenting visual acuity in the better eye was associated with functional vision in this populations. Decrease in functional vision was associated with the presence of Glaucoma, Corneal disease, or Retinal disease independent of visual acuity and with cataract as a function of visual acuity.¹

Another study on Measurement of vision function and Quality of life in patients with cataracts in Southern India concluded that the functional and psychological impacts described by visually impaired participants in India are similar to those reported in other population settings although the context and impact of problems vary.⁶

In a study conducted in Nepal on, Visual functioning and quality of life outcomes among cataract operated and un-operated blind populations, it was concluded that, Cataract surgery outcomes, whether measured by traditional visual acuity or by patient reported VF/QOL, are at levels many would consider unacceptably low.³

In a study in China on Visual acuity and quality of life outcomes in patients with cataract in Shunyi

County, it was reported that both clinical and patient-reported cataract surgery outcomes are below what should be achievable.⁴

A study in Hong Kong on visual acuity and quality of life outcomes in cataract surgery patients concluded that although vision outcomes were consistently correlated with all VF/QOL subscale scores, there was a differential impact with VF subscales usually being affected more by reduced acuity than the more general QOL subscales.⁵

Conclusions

In this study Visual function score and Quality of Life questionnaire developed by Aravind eye institute have been used to assess the extent of visual disability, seen in cataract patients. In the present study it was found that the visual function and quality of life was quite poor among the respondents. It was also noted that the visual function score and the quality of life score worsen as the visual acuity deteriorates. This questionnaire can be used while screening a cataract patient as a baseline to evaluate the functional vision. This may act as a guide in selecting patient for surgery. This tool may also be used to educate and motivate patients to undergo cataract surgery as these criteria are better understood by patients than mere visual acuity on Snellen's chart.

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