EFFECT OF CATARACT AND UNCORRECTED REFRACTIVE ERROR ON QUALITY OF LIFE

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ABSTRACT

BACKGROUND

Several studies have been conducted to know the prevalence of various causes of visual impairment and risk factors for the eye diseases but the impact of these diseases on the quality of life has not been extensively investigated.

AIM

To show the effect of visual impairment on quality of life and to determine the correlation of cataract and uncorrected refractive error with quality of life.

DESIGN

Prospective, Descriptive Study.

MATERIAL AND METHODS

500 patients with diagnosed cataract (n=450) and uncorrected refractive error (n=50) who attended the Outpatient Department of Ophthalmology in Christian Medical College, Ludhiana from January 2014 to June 2014 were administered the National Eye Institute 25 Item Visual Function Questionnaire (NEI VFQ-25) which has a base set of 25 vision-targeted questions. All answered items were scored so that a higher score indicated better functioning. Continuous variables were expressed as mean±standard deviation and categorical variables were expressed as percentages. Multiple regression analysis was used to compare the scores with and without adjustment of visual acuity. A two-tailed p value < 0.05 was considered significant.

RESULTS

The mean age in our study was 59.87 years in cataract and 33.33 years in refractive error. There was a positive correlation in subjects with refractive error in most of the subscales in both with and without adjustment for visual acuity ($p<0.05$). The difference in scores between with and without adjustment of visual acuity groups was modest. For patients with cataract, there was significant reduction in all the subscale scores except for ocular pain, psychosocial domains and colour vision after adjusting for visual acuity. The subjects with refractive error had greater scores in all subscales when compared to those with cataract and the difference was statistically significant ($p=0.000$).

CONCLUSIONS

It was found that quality of life was significantly reduced as the visual impairment progressed. We also found that vision had a predominant effect on the quality of life than the eye disease alone.

KEYWORDS

Visual Impairment, Quality of Life, Cataract, Uncorrected Refractive Error, NEI VFQ-25.

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INTRODUCTION: Visual impairment has been shown to have negative effect on health related quality of life. Although reports are available on the prevalence of various causes of visual impairment and risk factors for the eye diseases, the impact of these diseases on the quality of life has not been extensively investigated.[1,2]

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Visual function is the most important sensory function of the human body, hence, visual impairment leads to functional disability which is associated with increased risk for fall and other accidental injuries.[3] Over the past 20 years, multiple instruments have been developed to measure quality of life. Some of the scales are disease specific. Examples of vision-specific instruments are 7 and 14 item visual function tests (VF-7, VF-14) and the National Eye Institute Visual Functioning Questionnaire (NEI-VFQ).[4,5,6] Given that most leading causes of visual impairment are age related, the expected increase in the number of elderly population will aggravate the problem of blindness. In the elderly, limitations in mobility and poor physical performance are associated with worsening of visual function.

Resource-poor nations need evidence, especially related to longterm impact, to assist them in the prioritisation and allocation of scarce resources.[7,8] Therefore, this study was conducted to evaluate the effect of visual impairment on the quality of life.

METHODS: It was a prospective, descriptive study of 500 patients who attended the Outpatient Department of Ophthalmology of Christian Medical College & Hospital, Ludhiana from January 2014 to June 2014. Convenient sampling was used for the study and the sample included 450 cataract patients and 50 patients with uncorrected refractive error in the age Group of 18 to 70 years with vision less than or equal to 6/18. Participants were interviewed using the National Eye Institute 25 Item Visual Function Questionnaire (NEI VFQ-25). Written informed consent was obtained from the subjects before the interview. Participants' education was classified into one of 3 Groups- illiterate (Group 1), primary-secondary school education (Group 2), higher secondary school education-graduates (Group 3). Distance visual acuity, both presenting (with current refractive correction, if any) and best corrected, was measured for each eye separately using Snellen visual acuity chart.

An E chart was used for participants who were illiterate. Near visual acuity was measured with Times New Roman near vision chart. A person was considered to have uncorrected refractive error if the difference between best-corrected and presenting acuity was more than 2 Snellen lines. For the purpose of the study, presenting visual acuity was considered and not the best corrected vision. Both anterior segment and posterior segment examinations were performed at the slit lamp and indirect ophthalmoscopy was done where necessary. Examination also included non-contact pneumatic tonometry for intraocular pressure, computer refractometer optometry, perimetry using 24-2 SITA standard protocol of the Zeiss-Humphrey Field Analyser II and applanation tonometry as and when required. Primary causes of visual impairment and eye diseases were assessed based on clinical history and examination results.

The National Eye Institute 25 Item Visual Function Questionnaire which was taken up for the study consists of a base set of 25 vision targeted questions, divided into 3 primary parts- general health and vision, difficulty with activities and response to vision problem. The Questionnaire is further divided into 12 vision-targeted subscales which includes general health (GH), general vision (GV), difficulty with near vision activities (N), difficulty with distant vision activities (D), driving difficulties (Dr), ocular pain (OP), role limitation due to vision (RD), dependency on others due to vision (De), limitation in social functioning (SF), mental health symptoms (MH), limitation with peripheral vision (PV) and colour vision (CV). The participants were asked to respond to the questionnaire depending on their experiences over the past one month. Participant's response was excluded from a specific question if they had stopped the activity for reasons other than poor eye sight.

If more than 20% of the responses were missing, the participant was excluded from the study. In step 1, the original numeric values from the survey were re-coded following the scoring rules as outlined in Table 1. All items were scored so that a higher score represented better functioning. Each item was then converted to a 0 to 100 scale so that the lowest and highest possible scores were set at 0 and 100 points, respectively. In this format, scores represented the achieved percentage of the total possible score, e.g. a score of 50 represented 50% of the highest possible score. In step 2, items within each subscale were averaged together to create the 12 subscale scores. Table 2 indicates which items contribute to each specific subscale.

In step 3, an overall composite score for the VFQ-25 was calculated by averaging the vision-targeted subscale scores, excluding the general health rating question. By averaging the subscale scores rather than the individual items, we gave equal weight to each subscale, whereas averaging the items would have given more weight to scales with more items. The NEI VFQ-25 instrument was also translated into the Hindi and Punjabi languages.

Item Numbers	Change Original Response Category	To Re-coded Value of:
1, 3,4 , 15c	1	100
	2	75
	3	50
	4	25
	5	0
	1	100
	2	80
	3	60
	4	40
	5	20
	6	0
5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 16a	1	100
	2	75
	3	50
	4	25
	5	0
	6	*
17, 18, 19, 20, 21, 22, 23, 24, 25	1	0
	2	25
	3	50
	4	75
	5	100

Table 1

Scale (After re-coding from Table 1)	Number of Items	Items to be Averaged
General Health	1	1
General Vision	1	2
Ocular Pain	2	4, 19
Near Activities	3	5, 6, 7
Distance Activities	3	8, 9, 14
Social Functioning	2	11, 13
Mental Health	4	3, 21, 22, 25
Role Difficulties	2	17, 18
Dependency	2	20, 23, 24
Driving	3	15c, 16, 16a
Colour Vision	1	12
Peripheral Vision	1	10

Table 2: Averaging of Items to Generate VFQ-25 Subscales

RESULTS: The mean age in our study was 59.87 years in cataract and 33.33 years in refractive error. 58% were women and 42% were men. For statistical purposes, we categorised the visual acuity in better eye based on WHO grading of visual impairment:

Category 1- 6/18 to ≥6/60,
Category 2- 6/60 to ≥3/60,
Category 3-3/60 to ≥1/60.
Category 4-1/60 to Light perception.

In subjects with refractive error, the lowest score was seen in the subscale of general vision and role difficulties. There was a positive correlation in most of the subscales for both with and without adjustment for visual acuity (Table 3). However, in general vision and ocular pain, there was a negative correlation. The difference in scores between with and without adjustment of visual acuity Groups was modest.

	Without Adjustment of Visual Acuity	P Value	With Adjustment of Visual Acuity	P Value
GH	19.273(15.731 to 22.815)	<0.0005	18.973(15.404 to 22.542)	<0.0005
GV	-8.617(-14.281 to-2.954)	<0.0005	-0.578(-5.367 to 4.211)	<0.0005
OP	-10.477(-15.09 to-5.864)	<0.0005	-10.929(-15.575 to-6.283)	<0.0005
N	29.597(23.331 to 35.864)	<0.0005	23.151(18.321 to 27.98)	<0.0005
D	16.293(10.491 to 22.095)	<0.0005	9,995(5.708 to 14.283)	<0.0005
SF	25.841(19.363 to 32.319)	<0.0005	18.547(13.92 to 23.174)	<0.0005
MH	21.658(15.062 to 28.255)	<0.0005	15.22(9.957 to 20.483)	<0.0005
RD	25.764(19.868 to 31.661)	<0.0005	20.628(15.646 to 25.611)	<0.0005
De	21.323(12.35 to 30.296)	<0.0005	12.403(5.325 to 19.481)	0.001
Dr	20.728(7.599 to 33.858)	0.002	18.154(6.546 to 29.761)	0.003
CV	15.136(8.163 to 22.109)	<0.0005	7.803(2.516 to 13.091)	0.004
PV	25.773(18.914 to 32.632)	<0.0005	18.902(13.518 to 24.285)	<0.0005

Table 3: Regression Value of Subscale Scores in Refractive Error

*GH- General Health, GV- General Vision, OP- Ocular Pain, N- Near vision limitations, D- Distance vision limitations, SF- Social Functioning, MH- Mental Health, RD- Role Difficulty, De- Dependency, Dr- Driving difficulties, CV- Colour Vision, PV- Peripheral Vision.

For patients with cataract, there was significant reduction in all the subscale scores except for ocular pain, psychosocial domains and colour vision after adjusting for visual acuity. There was only slight change in the scores when adjusted for visual acuity (Table 4).

	Without Adjustment of Visual Acuity	P Value	With Adjustment of Visual Acuity	P Value
GH	-5.111(-7.544 to-2.678)	<0.0005	-5.235(-7.658 to-2.813)	<0.0005
GV	-3.478(-6.096 to-0.859)	0.009	-4.199(-6.34 to-2.058)	<0.0005
OP	7.139(4.201 to 10.076)	<0.0005	7.096(4.155 to 10.037)	<0.0005
N	-3.612(-7.88 to 0.656)	0.097	-4.932(-8.187 to-1.676)	0.0003
D	-2.368(-6.159 to 1.424)	0.221	-3.616(-6.364 to-0.867)	<0.0005
SF	-3.917(-8.247 to 0.414)	0.076	-5.386(-8.435 to-2.336)	0.001
MH	0.693(-3.661 to 5.047)	0.755	-0.594(-4.017 to 2.829)	0.733
RD	-0.939(-4.926 to 3.049)	0.644	-1.994(-5.317 to 1.329)	0.239
De	3.533(-2.291 to 9.357)	0.234	1.781(-2.746 to 6.307)	0.44
Dr	-11.507(-22.756 to-0.259)	0.045	-16.72(-26.211 to-7.229)	0.001
CV	2.611(-1.902 to 7.124)	0.256	1.177(-2.195 to 4.55)	0.493
PV	-5.944(-10.493 to-1.396)	0.011	-7.336(-10.831 to-3.841)	<0.0005

Table 4: Regression Value of Subscale Scores in Cataract

*GH- General Health, GV- General Vision, OP- Ocular Pain, N- Near vision limitations, D- Distance vision limitations, SF- Social Functioning, MH- Mental Health, RD- Role Difficulty, De- Dependency, Dr- Driving difficulties, CV- Colour Vision, PV- Peripheral Vision.

The subjects with refractive error had greater scores in all subscales when compared to those with cataract (Table 5) and the difference was statistically significant.

Subscale	RE	CATARACT	P VALUE
GH	46.5	27.4	.000
GV	59.8	41.7	.000
OP	81.1	91.6	.000
N	84.7	54.5	.000
D	70.0	55.0	.000
SF	91.4	66.1	.000
MH	75.3	50.4	.000
RD	67.6	43.5	.000
De	86.2	66.8	.000
Dr	80.0	63.4	.000
CV	97.0	83.4	.000
PV	80.5	54.5	.000
Composite Score	79	61	.000

Table 5: Subscale Scores and Composite Scores in both Groups

*GH- General Health, GV- General Vision, OP- Ocular Pain, N- Near vision limitations, D- Distance vision limitations, SF- Social Functioning, MH- Mental Health, RD- Role Difficulty, De- Dependency, Dr- Driving difficulties, CV- Colour Vision, PV- Peripheral Vision.

	Category 1	Category 2	Category 3	Category 4	P value
Sample size	74	93	101	232	0.015
GH					
Mean±SD	33.78±15.72	29.57±15.17	29.7±14.01	27.91±11.85	
GV					<.0001
Mean±SD	52.7±13.06	47.37±11.22	42.87±12.03	39.48±13.83	
OP					0.027
Mean±SD	87.5±20.59	91.26±14.83	87.38±16.54	91.97±12.93	
N					<.0001
Mean±SD	72.62±15.95	62.83±17.08	55.6±19.87	49.04±21.89	
D					<.0001
Mean±SD	71.11±12.34	63.3±13.63	54.29±17.45	50.09±19.92	
SF					<.0001
Mean±SD	85.98±13.56	77.02±14.07	69.43±17.09	60.29±23.83	
MH					<.0001
Mean±SD	68.1±18.72	63.44±19.48	51.71±19.61	44.64±22.92	
RD					<.0001
Mean±SD	61.82±20.58	52.82±17.59	43.85±16.57	39.76±19.43	
De					<.0001
Mean±SD	87.26±19.57	83.23±20.47	67.4±26.57	57.15±31.47	
Dr					0.103
Mean±SD	74.39±17.38	54.84±18.96	59.7±20.68	64.55±24.4	
CV					<.0001
Mean±SD	95.95±9.28	93.01±11.87	88.12±15.25	77.16±26.94	
PV					<.0001
Mean±SD	78.72±19.27	65.32±17.69	58.17±20.03	48.17±24.38	
COMPOSITE SCORE					<.0001
Mean±SD	76.37±10.34	69.89±9.95	61.81±12.15	55.71±17.83	

Table 6: Correlation between Different Categories of Visual Acuity and Subscales

*GH- General Health, GV- General Vision, OP- Ocular Pain, N- Near vision limitations, D- Distance vision limitations, SF- Social Functioning, MH- Mental Health, RD- Role Difficulty, De- Dependency, Dr- Driving difficulties, CV- Colour Vision, PV- Peripheral Vision.

DISCUSSION: Impaired vision is the most common type of impairment in the world. But little is known about the effect of visual impairment on quality of life. By assessing the impact of visual impairment on quality of life, it helps to provide a comprehensive picture of the burden of visual impairment beyond clinical evaluation. The National Eye Institute 25 Item Visual Function Questionnaire (NEI VFQ-25) is the most used vision-specific instrument and has been used in many studies around the world. The NEI VFQ-25 was sensitive to changes in vision-specific domains of QOL.

According to Bremon-Gignac et al,[9] it is the only instrument that is capable of providing information that is both sensitive and specific to eye problems while at the same time providing information on the general health condition. In our study, the general health was low in all the subjects and probably age related. The score for general health reduced as the vision reduced from category 1 to 4 (p=0.015). There was increase in the scores of the ocular pain as the visual impairment progressed (p=0.027).

Reduction in the scores of near vision, distant vision, peripheral vision and colour vision were significant as the vision reduced from category 1 to category 4 (p<0.0001). However, there was no significant decrement in the scores between the Groups where driving was concerned (p=1.03). This result may have been affected by the low number of qualified responses to the driving subscale of questions, especially in the cataract Group. Other quadrants like social functioning, role difficulty and dependency subscales were also significantly affected with increasing visual impairment (p<0.0001). Steep decline was seen in psychosocial domains (Like mental health, dependency, etc.) and this decline was seen even with moderate decrease in vision. The composite scores showed significant reduction as the visual impairment progressed (p<0.0001). In subjects with refractive error, when adjusted for visual acuity, refractive error and visual impairment had equal direction of effect on all the subscales suggesting that effect on the quality of life was dependent on visual acuity.

They also had better subscale scores than those with cataract but the fact that majority of the refractive error patients had moderate visual impairment may have influenced this observation. In the study conducted by Broman et al[7] using the NEI VF-25, those with uncorrected refractive error had lower scores than those without disease in general but had better quality of life when compared to subjects with diabetic retinopathy and cataract. Nutheti et al[10] used the World Health Organisation Quality of Life (WHOQOL) scale and found that visual impairment from corrected and uncorrected refractive error had no significant effect on the quality of life. However, it is to be noted that in their study, 90% of the subjects had visual impairment not worse than the 'Moderate' category and this may have affected the finding. In our study, the change in the scores after adjustment for visual acuity was not statistically significant in cataract which again suggested that detrimental effect on quality of life was dependent on visual acuity. This finding is similar to those of Nutheti et al[10] and Nirmalan et al[11] and implies that cataract extraction improves quality of life by improving the vision.

CONCLUSION: Our study shows that visual impairment was associated with reduction in most of the domains of visual quality of life as assessed by the NEI VFQ-25 instrument. The quality of life was more affected by the visual acuity than the eye disease.

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REFERENCES

1. West SK, Munoz B, Rubin GS, et al. Function and visual impairment in a population-based study of older adults: the SEE project. Salisbury eye evaluation. Invest Ophthalmol Vis Sci 1997;38(1):72-82.
2. Rubin GS, Munoz B, Bandeen-Roche K, et al. Monocular versus binocular visual acuity as measures of vision impairment and predictors of visual disability. Invest Ophthalmol Vis Sci 2004;41(11):3327-3334.
3. Mills T, Law SK, Walt J, et al. Quality of life in glaucoma and three other chronic diseases: a systematic literature review. Drugs Aging 2009;26(11):933-950.
4. Uusitalo RJ, Brans T, Pessi T, et al. Evaluating cataract surgery gains by assessing patients quality of life using the VF-7. J Cataract Refract Surg 1999;25(7):989–994.
5. Steinberg EP, Tielsch JM, Schein OD, et al. The VF-14. An index of functional impairment in patients with cataract. Arch Ophthalmol 1994;112(5):630-638.
6. Mangione CM, Lee PP, Pitts J, et al. Psychometric properties of the national eye institute visual function questionnaire (NEI-VFQ). NEI-VFQ field test investigators. Arch Ophthalmol 1998;116(11):1496-1504.
7. Broman AT, Munoz B, West SK, et al. Blindness, visual impairment and the problem of uncorrected refractive error in a Mexican-American population: proyecto VER. Invest Ophthalmol Vis Sci 2002;43(3):608-614.
8. Chia EM, Mitchell P, Rochtchina E, et al. Unilateral visual impairment and health related quality of life: the Blue Mountains eye study. Br J Ophthalmol 2003;87(4):392–395.
9. Bremond-Gignac D, Tixier J, Missotten T, et al. Evaluation of the quality of life in ophthalmology. Presse Med 2002;31(34):1607-1612.
10. Nutheti R, Shamanna BR, Nirmalan PK, et al. Impact of impaired vision and eye disease on quality of life in Andhra Pradesh. Invest Ophthalmol Vis Sci 2006;47(11):4742-4746.
11. Nirmalan PK, Tielsch JM, Katz J, et al. Relationship between vision impairment and eye disease to vision-specific quality of life and function in rural India: the Aravind comprehensive eye study. Invest Ophthalmol Vis Sci 2005;46(7):2308-2312.