

The impact of primary open-angle glaucoma: Quality of life in Indian patients

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Purpose: Glaucoma significantly affects the quality of life (QoL) of a patient. Despite the huge number of glaucoma patients in India, not many, QoL studies have been carried out. The purpose of the present study was to evaluate the QoL in Indian patients with varying severity of glaucoma. **Methods:** This was a hospital-based, cross-sectional, analytical study of 180 patients. The QoL was assessed using orally administered QoL instruments comprising of two glaucoma-specific instruments; Glaucoma Quality of Life-15 (GQL-15) and Viswanathan 10 instrument, and 1 vision-specific instrument; National Eye Institute Visual Function Questionnaire-25 (NEIVFQ25). **Results:** Using NEIVFQ25, the difference between mean QoL scores among cases (88.34 ± 4.53) and controls (95.32 ± 5.76) was statistically significant. In GQL-15, there was a statistically significant difference between mean scores of cases (22.58 ± 5.23) and controls (16.52 ± 1.24). The difference in mean scores with Viswanathan 10 instrument in cases (7.92 ± 0.54) and controls (9.475 ± 0.505) was also statistically significant. QoL scores also showed moderate correlation with mean deviation, pattern standard deviation, and vertical cup-disc ratio. **Conclusion:** In our study, all the three instruments showed decrease in QoL in glaucoma patients compared to controls. With the increase in severity of glaucoma, corresponding decrease in QoL was observed. It is important for ophthalmologists to understand about the QoL in glaucoma patients so as to have a more holistic approach to patients and for effective delivery of treatment.

Key words: Glaucoma, Glaucoma Quality of Life-15 (GQL-15), National Eye Institute Visual Function Questionnaire-25 (NEIVFQ25), Quality of Life (QoL)

Primary open-angle glaucoma (POAG) is a significant public health problem affecting 45 million people worldwide.^[1] Successful glaucoma therapy has revolved around reduction of intraocular pressure (IOP) that would hopefully prevent visual loss and disability in future. Physicians undoubtedly want their patients to be healthy and able to do their work independently. However, one study showed that patients value their vision more highly than most ophthalmologists realize.^[2] It is in the best interest of the physicians to bridge this gap between their perception and patient's values.

The concept of quality of life (QoL) differs among individuals and refers to subjective perception of well-being and the ability to pursue a happy and content life in context of their culture and value system.^[3,4] The QoL in patients of glaucoma can be affected in several ways such as due to decreased visual field and ultimately visual acuity, potential side effects of treatment, financial issues such as cost of medications, hospital visits, and psychological effects on the QoL including fear of blindness, anxiety, and depression.^[5-7]

Ophthalmologists have thus tried to quantify QoL in glaucoma patients. In 2001, the National Eye Institute developed the 25-Item Visual Function Questionnaire (NEIVFQ25), which is a shorter form of NEIVFQ51.^[8,9] This was designed to assess both patients' perception of their visual function and their QoL.^[9] The Glaucoma Quality of Life-15 (GQL-15) is a 15-item

questionnaire designed to assess the effect of binocular visual field loss on visual function.^[10,11] This instrument is shorter than the NEIVFQ25 and specifically designed for glaucoma patients. It has been shown to be reliable, has good internal consistency, and has a strong correlation with objective visual scores.^[10,12,13] The 10-item questionnaire devised by Viswanathan *et al.* was built on an earlier questionnaire that was designed to study severe vision loss.^[14] The questions in this instrument directly target functions and activities influenced by glaucoma. A study showed a significant correlation between different stages of glaucoma and mean deviation (MD), pattern standard deviation (PSD), and corrected pattern standard deviation (CPSD) by Viswanathan 10 instrument.^[14]

A study from Nigeria has previously documented the QoL in glaucoma patients using one vision-specific and one glaucoma-specific instrument, i.e., NEIVFQ25 and GQL-15, respectively.^[15] There is however paucity of data regarding QoL of glaucoma patients in India, despite the huge number of patients afflicted by this disease. In the past, one study from India has also quantified QoL of glaucoma patients using GQL-15, but the sample size in that study was small.^[16] To the best of our knowledge, no study from either India or elsewhere has used more than two instruments (one vision-specific such

Access this article online

Website:

www.ijo.in

DOI:

10.4103/ijo.IJO_847_17

Quick Response Code:



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Manuscript received: 15.09.17; Revision accepted: 21.12.17

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Cite this article as: Kumar S, Ichhpujani P, Singh R, Thakur S, Sharma M, Nagpal N. The impact of primary open-angle glaucoma: Quality of life in Indian patients. Indian J Ophthalmol 2018;66:416-9.

as NEIVFQ25 and two glaucoma-specific such as GQL-15 and Viswanathan 10) to assess QoL in glaucoma patients. This study was thus designed to evaluate the QoL in varying severity of glaucoma using multiple instruments.

Methods

A hospital-based, cross-sectional analytical study was carried out in outpatients visiting the glaucoma services of our hospital. A total of 180 patients were enrolled in the study including 140 cases and 40 controls. Written informed consent was obtained from all the patients enrolled in the study.

After being enrolled in the study, baseline ophthalmic evaluations were performed in each of the patients. These evaluations included detailed ocular history, visual acuity testing with refraction, IOP testing, gonioscopy with four mirror lens, dilated fundus examination with stereoscopic biomicroscopy of the optic nerve head using slit lamp, indirect ophthalmoscopy where indicated, and visual field testing. Cases were classified into mild, moderate, and severe glaucoma, respectively, depending upon visual field defects on Humphrey Field Analyser (HFA) using Hodapp–Parrish–Anderson criteria in less severely affected eye [Supplementary Material 1].^[17]

Patients of POAG with age 40 years or older and on medical therapy for POAG or who have had trabeculectomy at least 3 months before the study were enrolled as cases. Patients who had undergone trabeculectomy within the 3 months preceding the study period and/or patients with other ocular pathology such as visually significant cataract, diabetic retinopathy, hypertensive retinopathy, and age-related macular degeneration were excluded from the study.

Patients with refractive errors <5 D of myopia/hypermetropia or <2 D cylinder of astigmatism, nonvisually significant cataract, and with a best-corrected visual acuity (BCVA) of at least 20/30, normal-appearing optic nerve head, normal visual fields, no family history of glaucoma in a first-degree relative were included as controls. Patients with BCVA <20/30; with history of glaucoma, ocular hypertension, and suspicious optic disc; with other eye diseases such as visually significant cataract, diabetic retinopathy, and hypertensive retinopathy were excluded from the control group.

Procedure

All the patients were assessed by a single interviewer with orally administered QoL instruments comprising two glaucoma-specific instruments; GQL-15 and Viswanathan 10 instrument; and one vision-specific instrument; NEIVFQ-25 [Supplementary Material 2 and 3]. The patient was made to understand the instrument in their vernacular language by the interviewer. The interviews happened over the course of clinic visits, with GQL-15 and Viswanathan 10 in the index visit and NEIVFQ-25 in the follow-up visit. The patients were called telephonically to the clinic in case they missed a visit. The scoring was given according to recommended scoring algorithm for that questionnaire.^[9-11,14] Higher values of NEIVFQ-25 and Viswanathan 10 scale indicate better QoL, while in GQL-15, higher values indicate a lower QoL. The statistical analysis was done using SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp. ANOVA was used to compare the QoL scores across various severity of glaucoma,

and Pearson's correlation coefficient (CC) was used to assess the correlation of the scores with visual field MD, PSD, and vertical cup-disc ratio (VCDR).

Results

In the study, number of cases was 140 (77.78%) and controls was 40 (22.22%). The proportion of cases with mild glaucoma were 35.0%, moderate glaucoma were 39.28%, and severe glaucoma were 25.72% in our study. The case distribution is shown in Fig. 1. Both the study groups were comparable with respect to various sociodemographic parameters such as age and gender. The mean age in the cases was 62.15 ± 9.45 years and in controls was 64.57 ± 6.52 years. No statistically significant difference was observed between the two groups in any of these factors.

There was a predominance of males (63.89%) in our study. The majority of the cases in the study population were presently not working (52.85%) because they were either retired (23.57%) or unemployed (29.28%).

The scores obtained using the three instruments are summarized in Table 1. Table 2 shows the Pearson's CCs of various scores with MD, PSD, and VCDR of the study population.

Discussion

Glaucomatous visual field loss can significantly affect many daily activities, thereby affecting QoL of these patients.^[13,18,19] The knowledge regarding glaucoma affecting QoL of patients can be useful for guiding therapeutic choices and educating newly diagnosed glaucoma patients about different aspects of the disease. QoL research in glaucoma has made considerable progress and provided important insights over the past few decades.

Previously published studies have had a similar case distribution like our study. Goldberg *et al.* had similar distribution with 40.5% of cases with mild glaucoma, 28.1% with moderate glaucoma, and 31.4% with severe glaucoma.^[10] Onakoya *et al.* also divided their sample into 33.3% patients each of mild, moderate, and severe glaucoma.^[12]

In our study, NEIVFQ25 scores showed moderate correlation with MD and PSD values. Onakoya *et al.* have also reported similar correlation between MD worse eye and NEIVFQ scores. However, they could not find any significant

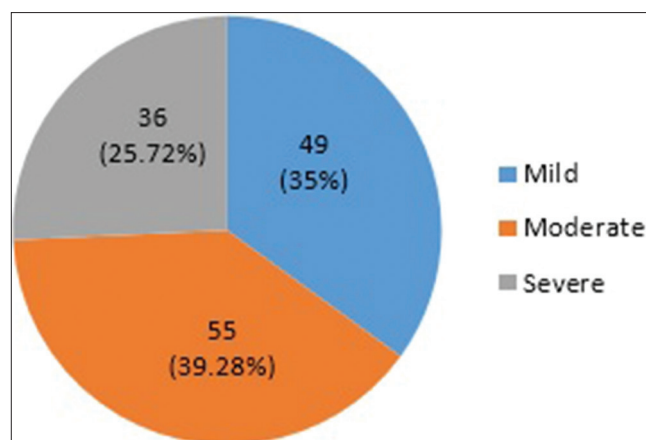


Figure 1: Pie chart showing the severity distribution of patients

Table 1: Scores obtained using various quality of life instruments (n=180)

QoL instrument	Controls (n=40) Mean score±SD	Mild (n=49)		Moderate (n=55)		Severe (n=36)	
		Mean score±SD	P	Mean score±SD	P	Mean score±SD	P
NEIVFQ25	95.32±5.76	94.65±3.25	1.00	88.38±4.93	<0.001	81.99±5.42	<0.001
GQL-15	16.52±1.24	16.02±3.05	1.00	19.38±6.38	0.03	32.36±6.27	<0.001
Viswanathan 10	9.47±0.50	9.32±0.55	1.00	8.74±0.61	<0.001	5.72±0.45	<0.001

Higher NEIVFQ25 and Viswanathan 10 scores correspond to better QoL, while higher scores with GQL-15 indicate lesser QoL. SD: Standard deviation, QoL: Quality of life, GQL: Glaucoma Quality of Life, NEIVFQ25: National Eye Institute Visual Function Questionnaire-25

Table 2: Pearson's correlation coefficients of various scores with mean deviation, pattern standard deviation, and vertical cup-disc ratio

QoL instrument	OD						OS					
	MD		PSD		VCDR		MD		PSD		VCDR	
	CC	P	CC	P	CC	P	CC	P	CC	P	CC	P
NEIVFQ25	0.603	<0.001	0.397	<0.001	0.312	<0.001	0.498	<0.001	0.340	<0.001	0.228	0.007
GQL-15	0.636	<0.001	0.532	<0.001	0.459	<0.001	0.500	<0.001	0.428	<0.001	0.312	<0.001
Viswanathan 10	0.640	<0.001	0.548	<0.001	0.335	0.002	0.568	<0.001	0.498	<0.001	0.295	0.007

CC: Correlation coefficients, MD: Mean Deviation, PSD: Pattern Standard Deviation, VCDR: Vertical Cup-Disc Ratio, QoL: Quality of life, GQL15: Glaucoma Quality of Life-15, NEIVFQ25: National Eye Institute Visual Function Questionnaire-25, OD: Oculus Dextrus, OS: Oculus Sinister

correlation between PSD values and the NEIVFQ scores.^[12] They argue that MD correlates better with central vision and thus better correlates with QoL. However, we feel that exclusion of other causes of vision loss such as cataract and refractive error in our study led to moderate correlation of PSD with QoL. The GQL-15 and Viswanathan scores in our study [Table 2] showed moderate correlation with MD and PSD in both eyes. Other studies also found moderate correlation of GQL-15 scores with MD and PSD values.^[10,12] Lester and Zingirian had shown a significant correlation between the score of the Viswanathan questionnaire and MD and PSD values.^[20]

Using NEIVFQ25, we were able to identify patients with moderate and severe glaucoma ($P < 0.001$). However, the difference between scores obtained for patients with mild glaucoma and controls was not statistically significant ($P > 0.05$). Our results are similar to the study done by Onakoya *et al.*, who could differentiate between mild, moderate, and severe cases but could not differentiate between the mild and controls.^[12] With GQL-15, we were able to identify patients with moderate and severe glaucoma. The difference between mean QoL scores between controls and mild glaucoma was not statistically significant ($P > 0.05$). On the other hand, the difference of scores in the moderate and severe glaucoma group was statistically significant ($P = 0.03$ and $P < 0.001$, respectively). Our results are similar to the study done by Onakoya *et al.*, who reported statistically significant difference between mild/severe and moderate/severe study groups but could not identify mild from moderate group.^[12] There are studies that have been able to identify mild glaucoma from controls using GQL.^[10,15,16] However, in our study GQL-15 could not differentiate mild glaucoma patients from the control group. With the Viswanathan instrument, the difference in the mean scores was statistically significant for moderate and severe glaucoma group when compared with the controls ($P < 0.001$). However, the difference between the mild glaucoma and control group was statistically not significant ($P > 0.05$). Similar

trend was observed in the study done by Lester and Zingirian, who found that the score value obtained in the mild glaucoma group was significantly different from the score of moderate and advanced glaucoma. Their study however did not have a control group unlike our study.^[20]

We are of the opinion that in our population, it was difficult to separate the mild glaucoma patients from the controls because of the demographic character of Indian patients. The instruments are designed for advanced countries where patients have more mobility, access to driving, and higher literacy.^[15,19] It is vital to formulate instruments for QoL data collection that takes into account local culture and social life. The percentage of population that was not working (52.8%) in our study is also higher as compared to previously published studies.^[12] This is another factor that could account for the difference in our results.

The use of oral instruments in the assessment of QoL has shortcomings as they are subjective and are affected by various factors such as culture, language, and education.^[21] These background variables can be the reason for the variable results observed in patients' responses to these instruments.^[22] To account for the limitations, performance-based measures, which assess what a person can and cannot do by actually observing the person attempting to perform specified tasks, have been developed but are still being validated.^[23]

There are certain other limitations of our study such as none of the instruments included in our study have questions regarding the antiglaucoma medications and their impact on QoL of the patient. This is another significant factor that needs to be addressed by future studies on QoL. The strengths of our study include the fact that the administration of questionnaire was carried out by one investigator alone and therefore interobserver error and bias were avoided. Moreover, our study has a fairly large sample size, which included adequate number of cases in various degrees of severity of the disease as well as normal controls. The fact that three QoL instruments

were used also provides a more comprehensive assessment of QoL of the study participants.

Much has been written and discussed about novel ways to treat and manage glaucoma, but the real-world effect of the disease on patient life has somewhat been ignored. Our study tries to fill in this lacuna of knowledge by giving insight into the relatively unexplored area of effect of glaucoma severity on the QoL in the Indian population, which may serve as a template for further conduction of larger studies.

Conclusion

NEIVFQ25, GQL-15, and Viswanathan 10 instrument can be interchangeably used to assess the QoL in glaucoma patients. All the three instruments were found to have moderate correlation with visual field indices. The use of such QoL instruments can make patients aware of the disease-related problems and hence improve compliance with treatment and follow-up regimens. No instrument was however able to differentiate between mild glaucoma patients and controls. Thus, there is still a lack of clarity about the "gold standard" instrument for QoL assessment, especially in patients with early glaucoma; further studies are therefore required to assess this aspect.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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