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Original Article

Evaluation and Correlation of Vision-Related Quality of life with Severity of Glaucoma

Prempal Kaur[1], Saroj Bala[2], Gurinder Kaur[3], Karamjit Singh[1], Anubha Bhatti[4]

[1]Professor, Department of Ophthalmology, Regional Institute of Ophthalmology, Government Medical College, Amritsar, Punjab, India,
[2]Associate Professor, Department of Ophthalmology, Regional Institute of Ophthalmology, Government Medical College, Amritsar, Punjab, India,
[3]Senior Resident, Department of Ophthalmology, Regional Institute of Ophthalmology, Government Medical College, Amritsar, Punjab, India,
[4]Assistant Professor, Department of Ophthalmology, Regional Institute of Ophthalmology, Government Medical College, Amritsar, Punjab, India

Abstract

Introduction: Glaucoma significantly affects the quality of life (QoL) of a patient. QoL measures are important in understanding the impact of a disease. The aims of the study are to evaluate the vision-related quality of life in patients of primary open-angle glaucoma (POAG) and correlate it with severity of the glaucoma.

Materials and Methods: The study was done on 100 diagnosed cases of POAG and 100 normal subjects. All subjects underwent a comprehensive clinical examination. Visual field testing using Humphrey Field Analyzer was performed to obtain mean deviation, vision-related quality of life was assessed using orally administered glaucoma quality of life-15 (GQoL-15) questionnaire. Chi-square test was used to find association among categorical variables. One-way ANOVA test with *post hoc* Tukey HSD was used to compare mean values among different subgroups. All analyses were done using Social Science Software (SPSS) Program, version 23.0 (IBM).

Results: The mean glaucoma quality of life (GQL) score of glaucoma cases was 23.78 ± 7.072, and for controls, it was 15.19 ± 0.563 ($P < 0.001$). The mean GQL score in early cases was 17.50 ± 2.731, in moderate cases was 21.87 ± 4.529, and in cases with severe glaucoma was 32.7±3.826 ($P < 0.001$).

Conclusion: Patients with glaucoma had significantly poor glaucoma-related quality of life than controls. Patients of primary open-angle glaucoma had reduced quality of life in early stage of disease, with the increasing disease severity, there is corresponding decrease in vision-related quality of life.

Key words: Glaucoma, Glaucoma quality of life-15, Mean deviation

INTRODUCTION

Glaucoma is at the second number for causing irreversible blindness worldwide according to the World Health Organization.[1] Despite advances in therapy, the global burden of glaucoma remains high and will continue to rise. At present, 79.6 million individuals are living with glaucoma (2020) and this number will increase to 111.8 million by year 2040.[2]

Quality of life (QoL) is thus the sum of a range of objectively measurable life conditions experienced by an individual. These may include physical health, personal circumstances (wealth, living conditions, etc.), social relationships, functional activities and pursuits, and wider societal and economic influences.[3]

Loss of vision is the main cause of morbidity relating to glaucoma and it is the main determinant of health-related QoL for glaucoma patients. This can impact driving, walking, venturing from home, reading, seeing at night, adjusting to different levels of illumination, judging distances, and seeing objects coming from the side.[4] As vision decreases, the psychological burden increases, together with a growing fear of blindness, social withdrawal from impaired vision, and depression. Other debilitating medical conditions, psychological and social constraints may influence patient's visual morbidity. All these factors interact in a complex manner and can be reflected in holistic QoL assessment.[5]

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Corresponding Author: Saroj Bala, 40, Friends Avenue, Opp. Power Colony, Majitha Road, Amritsar, Punjab, India.

This study was undertaken to evaluate vision-related quality of life in primary angle glaucoma patients (POAG) and its relationship with severity of glaucoma.

MATERIALS AND METHODS

After taking permission from the Institution Ethical Committee, the study was conducted in outpatients visiting Glaucoma Clinic of Regional Institute of Ophthalmology in North India. A total of 200 subjects were enrolled for the study including 100 cases and 100 controls. Written informed consent from all the patients enrolled in the study was taken in their vernacular language, in accordance with the Declaration of Helsinki.

All subjects underwent a complete ophthalmic examination that included assessment of visual acuity (VA), intraocular pressure, gonioscopy, and dilated fundus examination with stereoscopic biomicroscopy of optic nerve head using slit lamp and indirect ophthalmoscopy. Glaucomatous eyes were defined as eyes exhibiting structural glaucomatous changes, such as a vertical cup-disk asymmetry between fellow eye of >0.2, cup-disk ratio >0.6, and neuroretinal rim narrowing, and retinal nerve fiber layer defect with glaucomatous VF loss in corresponding hemifield. Cases were classified into early, moderate, and severe glaucoma, respectively, depending on mean deviation (MD) on Humphrey Field Analyzer (HFA) using Hodapp-Parrish-Anderson criteria in more severely affected eye. Early visual field loss was defined as a mean deviation of ≤−6 decibels (dB), moderate visual field loss was defined as a mean deviation of more than -6 dB but <−12 dB, and severe visual field loss as mean deviation of more −12 dB.

Patients of POAG with 40 years or older and on medical therapy for primary open-angle glaucoma were enrolled as cases. Patients with high myopia (>6 diopters), patients with corneal opacities, patients with secondary causes of glaucoma, and 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 diopters of myopia and hypermetropia or <2 D cylinder of astigmatism, non-visual significant cataract and a best-corrected visual acuity (BCVA) of at least 20/30, normal appearing optic nerve head, normal visual fields, and 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 disk; and with other ocular morbidity affecting vision such as visually significant cataract, diabetic retinopathy, hypertensive retinopathy, and age-related macular degeneration were excluded from the control group.

Procedure

Vision-related quality of life was assessed using the glaucoma quality of life-15 (GQOL-15) questionnaire. It consists of list of daily activities with the strongest relationship with visual field loss in glaucoma. Patient is instructed to circle the correct answer, the scale ranging from 1 to 5 where [0] stands for not able to perform any of the activities for non-visual reasons, [1] stands for no difficulty, [2] for a little bit of difficulty, [3] for some difficulty, [4] for quite a lot of difficulty, and [5] for severe difficulty in performing the activity.

The glaucoma quality of life-15 questionnaire: List of daily activities with the strongest relationship with visual field loss in glaucoma.

	None	A little bit	Some	Quite a lot	Severe	Do not perform for Non-visual reasons
Reading newspapers	1	2	3	4	5	0
Walking after dark	1	2	3	4	5	0
Seeing at night	1	2	3	4	5	0
Walking on uneven ground	1	2	3	4	5	0
Adjusting to bright lights	1	2	3	4	5	0
Adjusting to dim lights	1	2	3	4	5	0
Going from light to dark room or vice versa	1	2	3	4	5	0
Tripping over objects	1	2	3	4	5	0
Seeing objects coming from the side	1	2	3	4	5	0
Crossing the road	1	2	3	4	5	0
Walking on steps/ stairs	1	2	3	4	5	0
Bumping into objects	1	2	3	4	5	0
Judging distance of foot to step/curb	1	2	3	4	5	0
Finding dropped objects	1	2	3	4	5	0
Recognizing faces	1	2	3	4	5	0

Total scores of the above-mentioned questionnaire for all patients and controls were compared with each other and statistical analysis was carried out. Higher subscale scores indicate greater difficulty in performing vision-related activities and poorer QoL.

RESULTS

The mean age in cases was 58.77 ± 10.5 years and in controls was 57.84 ± 9.18 years (P = 0.19). There was

predominance of males in our study but no statistical difference was observed between two groups for gender ($P = 0.773$) [Tables 1 and 2].

DISCUSSION

Glaucomatous visual field loss can significantly affect many daily activities, thereby affecting QoL of these patients.[6] Over the past several years, an increased awareness of the effect of glaucoma on the patient's quality of life has developed. This parallels an increased interest throughout ophthalmology in the impact of disease and therapy on QoL.[7]

In our study, on perimetric evaluation, the mean deviation (MD) in cases was 11.12 ± 6.39 dB and in controls was 2.79 ± 0.58 dB. The intergroup difference of mean deviation was found to be statistically significant. Based on the severity of glaucoma, the distribution of cases in our study was 26% with early glaucoma, 46% with moderate glaucoma, and 28% with severe glaucoma. In a study done by Kumar *et al*., the proportion of cases with mild glaucoma was 35.0%, moderate glaucoma was 39.28%, and severe glaucoma was 25.72%.[8]

In our study, patients with glaucoma had significantly poorer glaucoma-related quality of life than controls with the mean glaucoma quality of life (GQL) score in glaucoma cases which was 23.27 ± 5.31 and for controls was 15.19 ± 0.56 ($P < 0.001$). Our results are similar to the study done by Onakoya *et al.* and Dhawan *et al.* who reported the mean GQoL-15 score of 24.07 and 26.00 ± 10.84 in glaucoma subjects and 15.75 and 15.02 ± 0.14 in controls, respectively.[9,10] Our study was also in agreement with studies conducted by Jampel *et al.* and Nah *et al.* who also concluded that the quality of life in patients with glaucoma was compromised as compared to healthy controls.[7,11]

In the study, early glaucoma cases had a mean GQL score of 17.50 ± 2.731, moderate cases had a mean GQL score of 21.87 ± 4.529, and cases with severe glaucoma had a mean GQL score of 32.7±3.826 ($P < 0.001$). The results are summarized in Table 2. Our results are similar to the study done by Goldberg *et al.* and other studies which have also shown that QoL worsen with increase in severity of glaucoma.[10,12-14]

The mean GQL score value obtained in the control group was significantly different from the GQL score of early, moderate, and severe glaucoma. Hence, our study showed that patients with early, moderate, and severe glaucoma exhibited significantly poorer QoL relative to that observed in patients without glaucoma. As the difference between score obtained from early glaucoma cases and control was also significantly statistically, we were able to identify the patients in early stages of glaucoma. Our findings are consistent with the findings of Naveen *et al.* who also found that POAG reduces QoL even in early stages of the disease.[14]

Use of GQL-15 has certain limitations; first, it is subjective; two patients with similar losses of visual ability from glaucoma may rate their QoL differently on a QoL scale; second, it does not include personality and other psychological factors which may influence GQL; and third, it does not have any question regarding antiglaucoma medication; cost and side effects of antiglaucoma drugs may influence GQL score.

Table 1: Demographic and clinical characteristics of study participants

	Glaucoma (*n*=100)	Normal (*n*=100)	*P* value
Age	58.77±10.5	57.84±9.18	0.19
Male/female	61/39	59/41	0.773
Log MAR (BCVA)	0.254±0.235	0.040±0.080	<0.001**
IOP	21.01±10.72	14.66±2.13	<0.001**
VCDR	0.737±0.135	0.356±0.098	<0.001**
MD	13.378±8.446	2.795±0.590	<0.001**
GQL-15 score	23.78±7.072	15.19±0.563	<0.001**

BCVA: Best-corrected visual acuity

Table 2: Distribution of cases and association between vision-related quality of life and severity of glaucoma

Severity	No.	GQOL score		MD	
		Mean	±SD	Mean	±SD
Normal	100	15.19	0.563	2.795	0.589
Glaucoma					
Early	26	17.50	2.731	5.526	0.225
Moderate	46	21.87	4.529	10.374	1.058
Severe	28	32.75	3.826	25.602	5.475
Overall		<0.001**		<0.001**	
WNL versus early		0.001*		<0.001**	
Early versus moderate		<0.001**		<0.001**	
Early versus severe		<0.001**		<0.001**	
Moderate versus severe		<0.001**		<0.001**	

*P<0.05: Significant; **P<0.001: Highly significant

CONCLUSION

Patients of POAG had reduced quality of life in early stage of disease which continued to decrease with increase in severity of the disease. GQol is a useful and simple measure of vision related QoL in patients of POAG. Thus, physician for effectively treating a patient of POAG should not only aim at regulating quantitative measures such as IOP, visual field, and optic disk changes but also assess his qualitative and subjective measures like QoL. This would make patients more compliant and increase their level of

satisfaction which would allow physician and patient to share common realistic goals, leading to better treatment outcomes.

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