



## ASSESSMENT OF QUALITY OF LIFE IN PATIENTS WITH GLAUCOMA

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### ABSTRACT

**Aim:** To evaluate the reliability of the Glaucoma Quality of Life (GQL-15) questionnaire in the Indian population, determine any differences in perceptions of the quality of life (QoL) between glaucoma patients and non glaucomatous control group and evaluate factors affecting the quality of life in glaucoma. **Materials and methods:** The study population comprised 2 groups. The glaucoma group comprised 50 glaucomatous and the control group, 50 non glaucomatous patients. Glaucoma group was stratified by visual field loss using the Nelson staging system into mild, moderate and severe groups. The QOL-15 questionnaire was administered addressing 4 factors of visual disability: central and near vision; peripheral vision; dark adaptation and glare; and outdoor mobility. Responses for each factor were coded on a scale of 0 to 5, 0 indicating abstinence from activity to 5 representing severe difficulty. **Statistical analysis:** Student t test and  $\chi^2$  test were used for statistical analysis. Correlation between QoL scores and age, intraocular pressure, and visual fields was studied using Pearson's correlation. **Results:** A total of 100 subjects participated in the study. The average age of patients in the glaucoma group was  $53.4 \pm 17.1$  years and in control group was  $40.3 \pm 12.7$  years. The mean value of GQL 15 scores in the glaucoma group was  $37.96 \pm 14.20$  and  $15.6 \pm 1.80$  in the control group ( $p < 0.001$ ). In glaucoma group, the average overall quality of life score in males was  $36.5 \pm 14.6$  and in females was  $39.6 \pm 13.9$ . In control group, the average quality of life score was similar among males and females ( $16.2 \pm 3$  vs  $15.3 \pm 0.87$ ). ( $p > 0.05$ ). The average quality of life scores increased with worsening field changes ( $P < 0.05$ ). The analysis of the overall QoL score with age and IOP showed no correlation ( $r = -0.13$ ,  $P > 0.05$ ). **Conclusion:** GQL-15 is an effective tool to measure quality of life in glaucoma. Quality of life in glaucoma patients is affected and deteriorated with the severity of the visual field loss. Age, gender and IOP did not affect the quality of life in glaucoma.

**KEYWORDS:** Quality of life, GQL-15, visual disability in glaucoma, visual field loss.

### INTRODUCTION

Glaucoma, a chronic progressive disease is the leading cause of irreversible blindness in the world. In India, 12 million people are affected accounting for 12.8% of the world blindness from glaucoma. By 2020, India will become second overall in number of people with glaucoma, surpassing Europe.<sup>[1]</sup> Therefore it is not surprising that glaucoma has a large impact on the patient's quality of life. As the disease is usually asymptomatic in the initial stages decision to initiate or modify any treatment in these patients varies depending on the individual expectations and this becomes a difficult task to the treating clinician. Medical and surgical treatment for glaucoma is aimed at reducing the intraocular pressure so as to prevent neuronal damage and halt the progression of the disease. The clinician is interested in clinical parameters such as intraocular pressure, visual acuity, field charting and side effects/complications of prescribed medications/surgery. These are considered as criteria for the success or failure of treatment.<sup>[2]</sup> Thus quality of life which forms a key

measure of the effects of glaucoma is ignored by the clinician.<sup>[2]</sup> Glaucoma patients can lose quality of life (QoL) for several reasons: the diagnosis itself, the functional loss, the inconvenience of the treatment, the side effects of the treatment and the cost of the treatment.

Visual assessment is an important indicator of day to day functioning of an individual and self assessment of a patient can give us a clue to the direct visual limitations due to the disease and thus becomes a more pertinent measure of visual function. Zimmermann and Lee were the first to highlight patient centred care in glaucoma rather than the visual parameters.<sup>[3,4]</sup>

Glaucoma-specific questionnaires, which are constructed by choosing questions on issues that are likely to be associated with glaucoma are more successful in assessing QOL in glaucoma patients. One such instrument is the Glaucoma Quality of Life-15 which has 15 questions on 4 domains. This tool is short and easy to use and has good internal consistency and reliability. The

GQL-15 has been shown to demonstrate that difficulties in everyday life are mirrored by poor performance in a number of psychophysical tests.<sup>[5-7]</sup>

Few studies in the recent years emphasized the need for patient centred care in glaucoma by their results that the quality of life in patients with glaucoma is compromised compared to the patients without glaucoma.<sup>[8-10]</sup> The major aims of this study was to evaluate the reliability of the GQL-15 questionnaire in the Indian population, determine any differences in perceptions of the quality of life between glaucoma patients and non glaucomatous control group and evaluate factors affecting the quality of life scores in glaucoma.

## MATERIALS AND METHODS

The study was conducted in the department of ophthalmology of a tertiary care hospital from March 2011 to June 2011. Ethical committee clearance of the institute was obtained for the study. The study population comprised 2 groups. All patients above 18 years of age who could understand English or Tamil were included in the study (illiterates could also participate). The glaucoma group comprised 50 patients with established diagnosis of glaucoma who were on treatment in the glaucoma clinic. The control group consisted of 50 patients with no glaucoma and no family history of glaucoma. Patients with any non glaucomatous condition or disease affecting visual function, such as cataract, diabetic retinopathy, age related macular degeneration, and patients with a history of laser or incisional eye surgery within 3 months of recruitment were excluded from the study. The control group was selected from the patients attending the OPD after glaucoma was ruled out.

After obtaining informed consent, patients eligible to participate in the study were interviewed. The demographic details were noted and all the data collected was kept confidential. Patients with glaucoma were stratified by glaucoma severity using the glaucoma staging system (GSS) developed by Nelson and colleagues wherein the central visual fields were classified into 3 groups: "mild" (unilateral loss with less than half of the visual field lost), "moderate" (unilateral loss with more than half of the visual field lost or bilateral loss with less than half of the visual field lost in each eye), or "severe" (bilateral loss with more than half of the visual field lost in either eye). After stratification the glaucoma quality of life 15 questionnaire was administered to all the patients.

The GQL-15 Questionnaire was translated into the local language (Tamil) and was reviewed by another Tamil expert. This version was back-translated to English by one person and was reviewed by another. The translators were not related to this study. The Tamil Questionnaire was pretested on ten healthcare providers to identify any ambiguity in various items. The subjects were given the option of self administration of the questionnaire or

administration by the interviewer (first author) and similarly for the language too (Tamil or English).

The GQL-15 questionnaire composed of 15 items addresses 4 factors of visual disability: central and near vision; peripheral vision; dark adaptation and glare; and outdoor mobility. (Appendix 1) For the GQL-15 summary scores, item level responses for each factor were coded on a scale of 0 to 5, wherein 0 indicates abstinence from activity owing to non visual reasons, 1 indicates no difficulty, and 5 represents severe difficulty.

## Statistical analysis

Using the statistical formula for comparison of two means, the sample size was estimated at 5% level of significance and 90% power to detect a mean difference of 4.4 based on the study by Nelson *et al.*<sup>[7]</sup> The minimum sample size estimated for the study was 35 in each group. This study was carried out on 50 patients with glaucoma and compared with 50 controls. The SPSS software version 19.0 was used to analyze the data. The QoL scores between the cases and controls and among the three stages of glaucoma were presented as mean with SD (standard deviation) and also expressed as percentages. Independent students 't' test was used for comparing the QoL scores between the cases and controls. X<sup>2</sup> test was used for comparing the categorical data. Correlation between QoL scores and age, intraocular pressure, and visual fields was studied using Pearson's correlation. All the statistical analyses were carried out at 5% level of significance and 'p' value < 0.05 was considered significant.

## RESULTS

A total of 100 subjects (50 glaucoma patients and 50 healthy controls) participated in the study. The average age of patients in the glaucoma group was 53.4 ± 17.1 years and in control group was 40.3 ± 12.7 years. The gender distribution of study participants are given in Table 1. There were 11 subjects in glaucoma group and 5 in controls with systemic comorbidities like hypertension, Diabetes, and asthma. In the glaucoma group, majority had primary open angle glaucoma. Seventeen were on single antiglaucoma medication and 8 were on combination drugs. Eleven patients had laser iridotomy, 13 had undergone Trabeculectomy, 2 had Ahmed Glaucoma valve implantation and 1 had non penetrating deep sclerectomy.

The mean intraocular pressure in the right eye of glaucoma group was 15.5 ± 4.7 (47 subjects) vs 9.92 ± 1.08 in the control group (50 subjects).

The GQL-15 questionnaire was administered by the interviewer in 90% of the patients in Tamil. The others self administered in English. The mean value of GQL 15 scores in the glaucoma group was 37.96 ± 14.20 and 15.6 ± 1.80 in the control group with a p value of < 0.001. In glaucoma group, the average overall quality of life score in males was 36.5 ± 14.6 which was lower than

that of females (39.6 ±13.9). In control group, the average quality of life score was similar among males and females (16.2 ±3 vs 15.3±0.87). The p value was greater than 0.05 (not statistically significant) in the 2 groups and thus the overall quality of life is independent of gender in both the groups.

The average quality of life scores in patients with severe glaucoma was 49.7 (±14.3), moderate glaucoma 35.6 (±11.5), mild glaucoma 30.8 (±9.4) and the difference was statistically significant (P<0.05). This shows that the quality of life becomes poorer as the severity of the disease progresses. The pair wise comparison on the quality of life score among the three stages of glaucoma

severity showed that the difference in scores between mild and moderate was only marginal and not statistically significant (P>0.05).

The percentage distribution of responses in different items of GQL-15 questionnaire in different stages of the disease in the glaucoma group are given in Table 2.

In the glaucoma group, the analysis of the overall QoL score with age showed no correlation (r=.13, P>0.05) (Based on Pearson's correlation). Similarly there was no relationship (P>0.05) between the QoL score and IOP based on Pearson's correlation.

**Table 1: Gender wise distribution of study participants.**

Group	Male		Female		Total	
	n	Mean (SD) Age (years)	n	Mean (SD) Age (years)	n	Mean (SD) Age (years)
Glaucoma	26	55.7 (18.9)	24	50.8 (14.9)	50	53.4 (17.1)
Control	15	47 (11.6)	35	37.4 (12.2)	50	40.3 (12.7)

**Table 2: Percentage distribution of responses in different items of GQL in different stages of the disease.**

Items	Severity	Response Options					
		0	1	2	3	4	5
Read newspapers	Mild	20.0	40.0	20.0	20.0	0.0	0.0
	Moderate	23.1	26.9	7.7	38.5	3.8	0.0
	Severe	31.6	5.3	21.1	15.8	15.8	10.5
Walk after dark	Mild	0.0	20.0	0.0	80.0	0.0	0.0
	Moderate	0.0	30.8	7.7	50.0	3.8	7.7
	Severe	0.0	10.5	10.5	31.6	15.8	31.6
Seeing at night	Mild	0.0	20.0	20.0	60.0	0.0	0.0
	Moderate	0.0	30.8	7.7	50.0	3.8	7.7
	Severe	0.0	5.3	15.8	31.6	15.8	31.6
Walking on uneven ground	Mild	0.0	40.0	0.0	40.0	20.0	0.0
	Moderate	0.0	30.8	11.5	42.3	3.8	11.5
	Severe	0.0	10.5	15.8	31.6	15.8	26.3
Adjusting to bright lights	Mild	0.0	20.0	60.0	20.0	0.0	0.0
	Moderate	0.0	30.8	26.9	38.5	3.8	0.0
	Severe	0.0	5.3	0.0	47.4	21.1	26.3
Adjusting to dim lights	Mild	0.0	20.0	20.0	60.0	0.0	0.0
	Moderate	0.0	23.1	26.9	42.3	3.8	3.8
	Severe	0.0	10.5	10.5	31.6	21.1	26.3
Going from light to dark room or vice versa	Mild	0.0	40.0	20.0	40.0	0.0	0.0
	Moderate	0.0	23.1	23.1	46.2	0.0	7.7
	Severe	0.0	21.1	21.1	10.5	26.3	21.1
Tripping over objects	Mild	0.0	40.0	20.0	40.0	0.0	0.0
	Moderate	0.0	38.5	11.5	42.3	0.0	7.7
	Severe	0.0	26.3	10.5	26.3	21.1	15.8
Seeing objects coming from the side	Mild	0.0	60.0	0.0	40.0	0.0	0.0
	Moderate	0.0	42.3	7.7	34.6	7.7	7.7
	Severe	0.0	21.1	10.5	31.6	10.5	26.3
Crossing the road	Mild	0.0	40.0	20.0	40.0	0.0	0.0
	Moderate	0.0	42.3	11.5	30.8	7.7	7.7
	Severe	0.0	15.8	21.1	21.1	15.8	26.3
Walking on steps/stairs	Mild	0.0	60.0	0.0	40.0	0.0	0.0

	Moderate	0.0	34.6	11.5	42.3	7.7	3.8
	Severe	0.0	10.5	10.5	47.4	21.1	10.5
Bumping into objects	Mild	0.0	60.0	0.0	40.0	0.0	0.0
	Moderate	0.0	34.6	19.2	42.3	3.8	0.0
	Severe	0.0	15.8	15.8	36.8	21.1	10.5
Judging distance of foot to step/kerb	Mild	0.0	60.0	20.0	20.0	0.0	0.0
	Moderate	0.0	42.3	19.2	34.6	3.8	0.0
	Severe	0.0	10.5	26.3	36.8	21.1	5.3
Finding dropped objects	Mild	0.0	40.0	40.0	20.0	0.0	0.0
	Moderate	0.0	30.8	26.9	38.5	0.0	3.8
	Severe	0.0	15.8	5.3	47.4	15.8	15.8
Recognizing faces	Mild	0.0	60.0	0.0	40.0	0.0	0.0
	Moderate	0.0	42.3	34.6	23.1	0.0	0.0
	Severe	0.0	15.8	5.3	52.6	10.5	15.8

## Appendix 1

### The Glaucoma Quality of Life-15 Questionnaire.

**Patient Instructions:** Please circle the correct answer on the scale from 1 to 5 where [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. If you do not perform any of the activities for other than visual reasons, please circle [0].

#### Does your vision give you any difficulty, even with glasses, with the following activities?

	None	A little bit	Some	Quite a lot	Severe	Do not perform for non visual reasons
Read newspapers	1	2	3	4	5	0
Walk 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/kerb	1	2	3	4	5	0
Finding dropped objects	1	2	3	4	5	0
Recognizing faces	1	2	3	4	5	0

## DISCUSSION

Visual problems due to glaucoma have a negative impact on the ability of patients to perform daily activities like reading, outdoor mobility, avoiding obstacles even though the central field of vision remains intact until the late stages of the disease. The main challenge for the glaucoma specialist is to guide the patients according to their therapeutic needs while at the same time maintaining their confidence in the goal of life-long acceptable levels of visual quality.

100 subjects which included 50 patients of glaucoma and 50 without glaucoma completed a questionnaire containing 15 questions covering 4 broad aspects of daily life activities using a five point answer scale. The GQL-

15 questionnaire is based on the assumption that perceived visual disability like delayed dark adaptation, glare, outdoor mobility tasks and activities using peripheral vision is significantly associated with binocular visual field loss. The tool though concentrating on the physical impact of the disease process does not address the broader QoL factors. Nonetheless the GQL-15 questionnaire was found to be a clinically user friendly tool compared to other instruments and hence we used it in our study.<sup>[11]</sup>

The mean GQL scores were statistically higher in the glaucoma group as compared to the control group. This is in agreement to other studies conducted by Jampel et al and Nah et al which showed that the quality of life in

patients with glaucoma is compromised compared to healthy controls.<sup>[12,13]</sup>

Our study showed that the overall quality of life is independent of gender in glaucoma group (though females had higher scores, this did not reach statistical significance). Verbrugge studied the gender difference in complaints and reported that women generally are found to report more symptoms than men.<sup>[14]</sup> We felt that in our study, men due to their higher social status in the Indian community were reluctant and felt less dignified to report their difficulties in daily work unlike the women of our society.

According to the study results the quality of life in glaucoma patients becomes poor as the disease progresses in severity. This is in agreement with various other studies.<sup>[10,15,16]</sup> The pair wise comparison on the quality of life score among the three stages of glaucoma severity showed that the difference in scores between mild and moderate was only marginal and not statistically significant. This finding was in contrast to the study by Goldberg et al which reports that the difference in the GQL 15 scores between all stages of glaucoma was statistically significant.<sup>10</sup> This may be explained by the fact that as the disease is diagnosed initially and treatment instituted patients with mild disease may have reported negative feelings where as the patients with moderate disease may have got adapted to the compromised visual function. Furthermore, the study parameters like patient's selection criteria, sample size and demographic variations may also be a cause for this finding.

Our study revealed that perceived visual disability relating to certain tasks such as walk after dark, seeing at night, walking on uneven ground, adjusting to bright light, walking on steps or stairs were affected more when compared to other activities. More than 60% of the patients reported a scoring greater than or equal to 3 indicating some difficulty atleast in these activities. This finding is in accordance to other studies like those by Nelson et al and Collaborative Initial Glaucoma Treatment Study (CIGTS).<sup>[7,15]</sup>

The analysis of the overall quality of life score with age showed no significant correlation, which is different from the study conducted by Goldberg et al which showed that younger patients with glaucoma reported greater vision-related dysfunction than older patients with glaucoma.<sup>[10]</sup> They explained that as age advances individuals have low expectations about perfect health, get used to living with the visual disability and tend to report less compared to younger patients. Their finding was similar to the finding by CIGTS that older age was associated with reporting less functional disability.<sup>16</sup> In our study, there was no correlation ( $P > 0.05$ ) between the quality of life score and IOP. Intraocular pressure might not be as relevant as antiglaucoma medications and field loss to quality of life. No studies to our knowledge have assessed the relationship between IOP and quality of life.

The strengths of the study were that our study was able to discriminate between different groups of visual field loss based on the quality of life scores. The interesting finding was the presence of a significant difference in the visual disability scores between patients with mild visual field loss and control subjects suggesting patients with mild disease also experience difficulty with daily tasks. The GQL questionnaire performed well and proved to be suitable for clinical use targeting glaucoma population. The main limitation of the study was the small sample size. The sample size has been calculated for the group as a whole and not for sub-group analysis after dividing on the basis of severity of glaucoma. There was a significant difference in the average age of the study and control group which could have confounded the results. We did not study how glaucoma medications could have affected the quality of life. Nevertheless, this study attempted to understand how quality of life is affected in glaucoma.

In summary the GQL-15 questionnaire is an effective instrument equally applicable to the Indian population as it correlated well with psychophysical tests such as automated perimetry. The study showed that quality of life is affected more in glaucoma patients and worsens with the severity of the disease. Factors such as age, gender and IOP did not affect the quality of life in glaucoma patients. Knowledge regarding the quality of life in glaucoma can help the treating clinician understand the broader perspectives of treatment and suggest changes in environment to cope up with the effects of the disease. It can also help in educating newly diagnosed patients about the gravity of the disease and how important it is to adhere to treatment so that their quality of life is not affected.

### Key Points

Glaucoma-specific questionnaires constructed by choosing questions on issues likely to be associated with glaucoma are more successful in assessing Quality of life (QOL) in glaucoma patients.

This study showed that GQL-15 questionnaire is an effective instrument to measure quality of life in glaucoma.

Quality of life is affected even in patients with mild glaucoma when compared to controls.

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