# Evaluation of Quality of Life in Patients on Different Treatment Modalities for Primary Glaucoma in a Tertiary Care Teaching Hospital- A Prospective Observational Study

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**Abstract:**

**Introduction:** Glaucoma, causes irreversible vision loss, involves optic nerve damage due to increased aqueous outflow resistance in primary open-angle glaucoma (POAG) or iris blockage in primary-angle closure glaucoma (PACG). **Objective:** This study evaluates different treatment patterns and their effectiveness in primary glaucoma using the NEI VFQ-25. **Method:** A 2-month prospective observational study included patients with primary glaucoma, excluding those with secondary glaucoma or other ocular conditions. The sample size was determined based on study duration. Treatment groups received medical, laser, or surgical interventions, alone or combined. NEI VFQ-25 was administered at baseline and one month. **Results:** Among 100 patients, mean age 56.7 years, equally divided between POAG and PACG, QoL improved significantly across all treatment groups, greatest in medical treatment alone, multimodal treatment, least. One-way ANOVA showed difference in treatment approach on outcomes. **Conclusion:** Using NEI-VFQ-25, study assessed QoL in glaucoma patients across six treatment groups, finding highest QoL with medical therapy alone and lowest with combined treatments.

**Keywords:** NEI-VFQ-25, Primary glaucoma, Quality of life

## Introduction:

Glaucoma, a leading cause of irreversible vision loss, involves optic nerve degeneration and visual field loss. Primary Open Angle Glaucoma (POAG) results from increased trabecular outflow resistance, while Primary Angle Closure Glaucoma (PACG) occurs due to iris blockage of drainage channels.[1] Topical drugs are the primary treatment for POAG, while surgery or laser therapy is required if medical management fails.[2] Glaucoma-related vision loss significantly impacts QoL, which varies with the treatment approach.[3] Here, we intend to evaluates QoL and drug use in primary glaucoma patients on different treatments. Glaucoma treatment aims to reduce intraocular pressure, with first-line therapies including prostaglandin analogues, beta-blockers, and carbonic anhydrase inhibitors.[1] Incisional surgeries, including trabeculectomy or tube shunt implantation, are used when medications and laser treatments do not provide sufficient results.[4] Assessing health-related quality of life (QoL) is vital for determining the success of glaucoma treatments, including medical and surgical approaches. Regular QoL assessments help track changes in patients' well-being and enable tailored modifications to their treatment strategies.[5]

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**Method:**

A 2-month prospective observational study was conducted after IRB approval (NHLIRB/2022/09/22/No-1) from November 2022 to December 2022. A total of 100 patients with primary glaucoma were selected based on convenient sampling. Patients over 18 years of age, providing informed consent, were included, while those with ocular co-morbidities, secondary glaucoma, or acute conditions were excluded. Patient receiving medical treatment, or other modalities like laser or surgical intervention were included. QoL was assessed using the NEI VFQ-25 at baseline and after one month.[5] The NEI VFQ-25 has 25 questions across 12 subscales. Its composite score, averaging 11 subscales (excluding General Health), summarizes the overall impact of visual impairment on QoL. Subscale scores ranged from 0 to 100, with composite scores averaging vision-related subscales. Data was recorded in case forms and analysed using Excel 2021 and SPSS 25. Paired t-tests compared composite scores between visits, while ANOVA assessed differences across six treatment groups ($p<0.05$ considered significant).

**Results:**

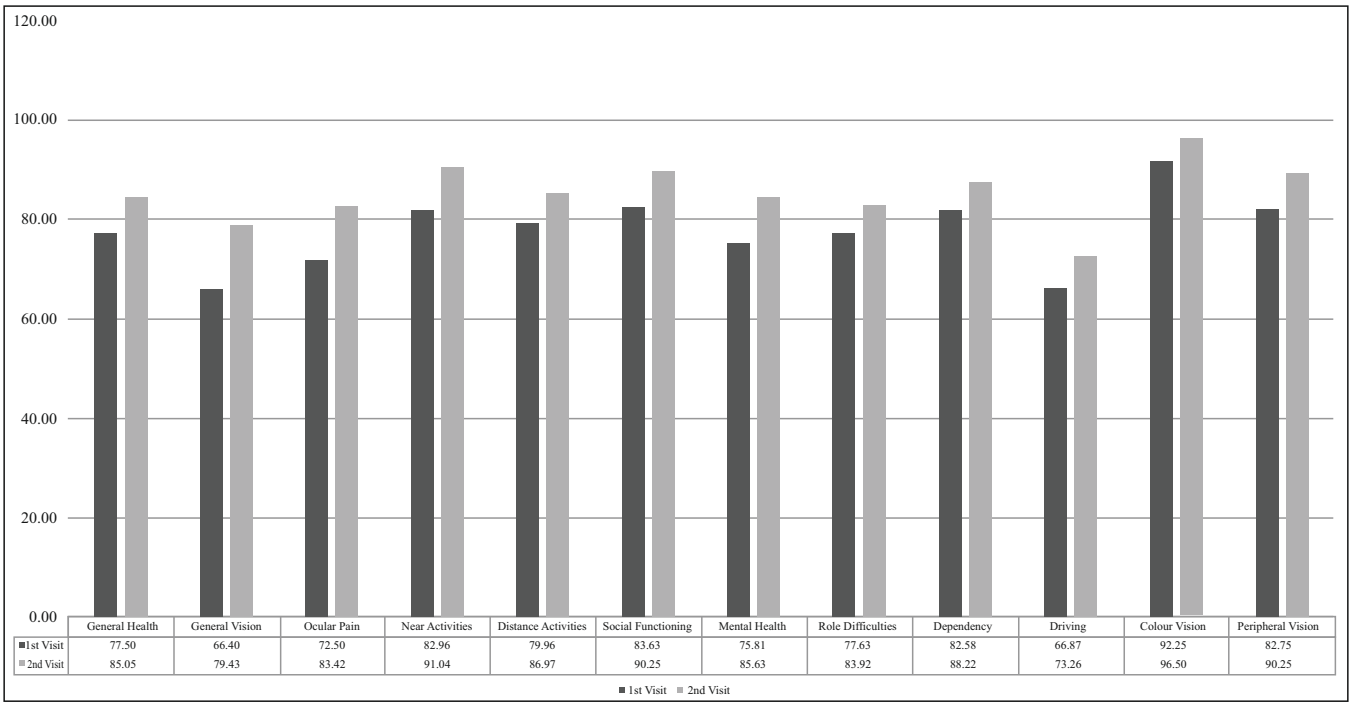
The study included 100 patients (55 males, 45 females, mean age 56.7, range 2284). Most were non-professionals. Co-morbidities included cardiovascular disease (43, with 34 hypertensive, 9 ischemic heart disease), diabetes (18), asthma, dyslipidaemia, and hypothyroidism (3 each). Common symptoms were diminished vision (86), headache (12), eye watering (9), halos/glare (7), pain (5), redness, and vertigo (2). Of 200 eyes studied, 177 were glaucomatous. Open-angle and angle-closure glaucoma were equally distributed (50 each). Newly diagnosed cases were 42, while 58 had

**Table 1: Drugs prescribed to the Study Participants (N=100)**

| Group wise Drugs | Route | n |
|---|---|---|
| Beta Blockers | | |
| Timolol | Topical | 53 |
| Betaxolol | Topical | 1 |
| Alpha Agonist | | |
| Brimonidine | Topical | 51 |
| Carbonic Anhydrase Inhibitors | | |
| Brinzolamide | Topical | 16 |
| Dorzolamide | Topical | 35 |
| Acetazolamide | Oral | 7 |
| Prostaglandin Analogues | | |
| Bimatoprost | Topical | 7 |
| Travoprost | Topical | 33 |
| Latanoprost | Topical | 8 |
| Rho-kinase inhibitors | | |
| Netarsudil | Topical | 4 |
| Ripasudil | Topical | 3 |
| Adjuvant Drugs | | |
| Moxifloxacin | Topical | 7 |
| Tobramycin + Fluorometholone | Topical | 21 |
| Carboxymethyl cellulose | Topical | 12 |
| Dexamethasone | Topical | 3 |
| Glycerol | Oral | 1 |
| Nepafenac | Topical | 2 |
| Atropine | Topical | 6 |

Nine prescriptions in this study contained two FDCs, while 56 prescriptions contained one. The most prescribed combination was Bimatoprost with Timolol (n=30). Postoperatively, 20 patients received Tobramycin with Fluorometholone, while 2 received Moxifloxacin with Dexamethasone, both combining an antibiotic with a steroid.

**Figure 2: Average of QoL scores in 12 subscales of NEIVFQ (N=100)**




| | General Health | General Vision | Ocular Pain | Near Activities | Distance Activities | Social Functioning | Mental Health | Role Difficulties | Dependency | Driving | Colour Vision | Peripheral Vision |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st Visit | 77.50 | 66.40 | 72.50 | 82.96 | 79.96 | 83.63 | 75.81 | 77.63 | 82.58 | 66.87 | 92.25 | 82.75 |
| 2nd Visit | 85.05 | 79.43 | 83.42 | 91.04 | 86.97 | 90.25 | 85.63 | 83.92 | 88.22 | 73.26 | 96.50 | 90.25 |

**Table 2: Mean composite score of 6 management groups at both visits (N=100)**

| Management Group | n | Mean, SD of Composite Score | | t value | p-value |
|---|---|---|---|---|---|
| | | 1st Visit | 2nd Visit | | |
| Only Medical | 42 | 80.138 (9.20) | 85.186 (7.52) | 7.22 | <0.01 |
| Only Laser | 17 | 71.129 (15.43) | 81.027 (11.27) | 4.439 | <0.01 |
| Only Surgical | 5 | 53.310 (6.09) | 67.667 (7.92) | 3.693 | 0.021 |
| Medical followed by Laser | 22 | 76.227 (10.36) | 85.125 (8.13) | 8.379 | <0.01 |
| Medical followed by Surgical | 10 | 70.44 (14.23) | 77.59 (12.50) | 3.583 | 0.006 |
| Medical followed by Laser and Surgical | 4 | 68.219 (20.26) | 75.407 (17.07) | 1.983 | 0.142 |

Composite Score = Average of vision targeted subscale scores (excluding general health rating question), Mean composite Score is calculated by averaging composite score of all the patients in that particular group.

prior diagnosis. Most (76) had no family history, 19 had one affected parent (11 mothers, 8 fathers), and 5 had both parents with glaucoma.

The study included six treatment groups: medical (26 old, 16 new), laser (2 old, 15 new), surgical (1 old, 4 new), medical + laser (16 old, 6 new), medical + surgery (9 old, 1 new), and medical + laser + surgery (4 old, 0 new), totalling 58 old and 42 new cases. Table 1 summarizes the frequency of each drug prescribed, either alone or in combination.

Figure 2 depicts QoL scores of all 12 subscales at the time of the first visit and at the time of second visit of patients. The highest change in the mean percentage of average QoL score is observed in General Vision (20%), Ocular Pain (15%), and Mental Health (13%), while the least change is seen in the Colour Vision subscale (5%).

Table 2 presents the mean composite scores of six management groups at both visits. One-way ANOVA of second-visit scores showed a significant difference among all groups ($p < 0.05$) except group 6.

Post hoc analysis with the Tukey HSD test ($p<0.05$) revealed significant QoL differences, particularly between medical-only (Group 1; Mean, SD - 85.186, 7.52) and surgical-only (Group 3; Mean, SD - 67.667,

7.92) patients, as well as between surgical-only (Group 3; Mean, SD-67.667, 7.92) and those receiving laser after medical treatment (85.125, 8.13).

The Mean Composite Score increased significantly between visits for both old and new glaucoma cases. Among old cases, the mean Composite Score rose from 75.91 (SD=12.64) at the first visit to 82.00 (SD=10.26) at the second visit ($t=8.395$, $p<0.001$). Similarly, new cases showed an increase from 73.64 (SD=13.65) to 83.00 (SD=10.21) ($t=8.405$, $p<0.001$), indicating a statistically significant change in both groups.

**Discussion**:

The primary goal of glaucoma treatment is to lower intraocular pressure, typically using first-line therapies such as prostaglandin analogues, beta-blockers, and carbonic anhydrase inhibitors.[1]

Hypertension, diabetes, and cardiovascular diseases were the most prevalent comorbidities reported in this study. A study by Muralidharan S et al.'s[5] reported the same.

Seth PK et al.[7] reported 36.4% POAG and 34.5% PACG cases. Present study's equal POAG and PACG distribution aligns with these findings, supporting the validity of demographic data of this study.[6] A family history of glaucoma significantly increases the risk. In this study, 19% of patients had a hereditary predisposition from one or both parents.

Glaucoma in its early or moderate stages can remain undetected for a long time. Key symptoms like blurred vision, headaches, and halos around lights should be considered along with visual field tests.[8]

Treatment approaches may deviate based on the stage and type of Glaucoma.[1] Patients were classified into six treatment groups. Three received only medication, laser therapy, or surgery, while the others had combined treatments. Most (42%) relied on medication, and only 4% underwent all three treatments.

Carbonic anhydrase inhibitors were the most prescribed (n=58), followed by beta-blockers (54), alpha-1 agonists (51), and prostaglandin analogues (48). Unlike a study by Meesala A. et al.[9] in another Indian region, where beta-blockers were most common, findings from this study contrast with standard guidelines favouring beta-blockers and prostaglandin analogues as first-line treatments.

This discrepancy highlights potential variations in clinical practice and adherence to guidelines. According to the American Academy of Ophthalmology's Preferred Practice Pattern for Primary Open-Angle Glaucoma, prostaglandin analogues and beta-blockers are generally the preferred initial treatments due to their effectiveness and safety profiles.[10]

Seven patients received Rho kinase inhibitors (Netarsudil, Ripasudil) alongside standard treatment. These novel drugs effectively lower IOP by relaxing the trabecular meshwork and enhancing aqueous humor outflow.[11]

Timolol was the most prescribed FDC component, often combined with Brinzolamide, Travoprost, or Dorzolamide, similar to Meesala A. et al.'s[9] findings.

Glaucoma primarily affected general vision, driving, and ocular pain. Post-treatment, the most notable QoL improvements were in general vision, ocular pain, and mental health.

QoL scores were lowest at baseline and follow-up in patients receiving medical, laser, and surgical treatments, while highest in those on medical therapy alone. Patient with severe glaucoma were on multiple treatment. All groups showed significant QoL improvement ($p<0.05$) except Group 6, likely due to the impact of advanced glaucoma requiring multiple treatments.

Pastore MR et al.[12] compared QoL and visual function in glaucomatous patients treated with medical therapy, canaloplasty, or trabeculectomy using NEI VFQ-25, While Pastore's study found canaloplasty to be better, results of present study showed that aggressive multi-modal treatments, like medical, laser, and surgery combined, resulted in the poorest QoL score.

A study done by Runjić T. et al.[3] suggested that there were significant differences in QoL scores depending on the severity of visual impairment, with

more severe impairment correlating with lower QoL i.e., those requiring more aggressive treatment, tending to have a more substantial negative impact on QoL.

One-way ANOVA showed significant differences in NEI-VFQ scores, indicating treatment type impacts QoL in primary glaucoma. A paired t-test showed significant QoL improvement in both groups.

**Strength and Limitations:**

This study comprehensively assessed QoL in glaucoma patients using the NEI VFQ-25, supported by a robust prospective design and statistical analysis. However, limitations include a small sample size, short follow-up of one-month, subjective assessments, and exclusion of patients with ocular comorbidities. Additionally, the lack of randomization and treatment allocation based on the patients condition or severity of glaucoma may have influenced the QoL scores.

**Conclusion:**

This study evaluated QoL in primary glaucoma patients across six treatment groups using the NEI VFQ-25. Patients on medical therapy alone had the highest QoL, while those undergoing medical, laser, and surgical treatments had the lowest, reflecting disease severity. One-way ANOVA showed significant differences, emphasizing treatment impact.

**Declaration:**

Funding: Nil

Conflicts of interest: Nil

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