ASSESSING QUALITY OF LIFE WITH GLAUCAT


Bridging the gap between clinical metrics and the patient experience.

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Most glaucoma specialists have encountered the following paradoxical scenarios:

- The patient whose visual field testing shows minimal disease progression, but they report significant difficulty with daily activities, and
- The patient with advanced disease who maintains remarkable functional independence.

One of the subspecialty's most persistent challenges is that clinical metrics tell only part of the story.

Traditional metrics such as IOP and visual field testing are essential for monitoring glaucomatous progression but correlate poorly with what matters most to patients: driving safely, reading comfortably, moving independently, and maintaining their emotional well-being. As health care moves toward an emphasis on patient-centered outcomes, physicians need tools that capture these dimensions.

GLAUCAT: COMPREHENSIVE, EFFICIENT, AND ADAPTIVE

The Glaucoma Computerized Adaptive Test (GlauCAT) is a new approach to quality-of-life (QOL) assessment in glaucoma. Developed and validated through a collaboration between the Singapore Eye Research Institute and Flinders University in Australia, GlauCAT uses computerized adaptive testing technology to assess patient-reported outcomes across 12 comprehensive domains:

- Visual symptoms;
- Ocular comfort;
- Activity limitation;
- Mobility;
- Emotional well-being;
- Health concerns;
- Social functioning;
- General convenience;
- Treatment convenience;
- Economic impact;
- Driving ability; and
- Light sensitivity.

The adaptive algorithm is what makes GlauCAT clinically practical. Traditional instruments require patients to answer lengthy, fixed questionnaires, which often take 20 to 45 minutes to complete. GlauCAT, in contrast, tailors item selection to the individual. The system begins with a question of medium difficulty, then adjusts subsequent questions based on responses to zero in on the patient's level of impairment. Validation studies have shown that this approach reduces assessment time by up to 70% while maintaining measurement precision, with most domains completed in less than 2 minutes.

VALIDATION STUDIES

The GlauCAT has been validated at multiple international sites. In Singapore, scores from the domains of activity limitation, mobility, light sensitivity, and health concerns decreased significantly with glaucoma severity, confirming meaningful differences across disease stages. Agreement between GlauCAT-derived scores and full-item bank estimates was high, and test-retest reliability was excellent.[1]

The first US pilot study at Massachusetts Eye and Ear Infirmary in Boston implemented six of the 12 domains. Results demonstrated clinical associations between GlauCAT scores and standard measures. Worse visual acuity correlated with greater activity limitation and reduced mobility, whereas poorer visual field mean deviation was associated with lower emotional well-being. In addition, patients with severe glaucoma had significantly lower scores than those with early disease in the domains of activity limitation, mobility, and health concerns.[2]

AT A GLANCE

- The GlauCAT is a patient-reported outcome measure that assesses quality of life across 12 domains in less than 15 minutes, reducing assessment time by 70% while maintaining measurement precision.
- Validation studies have shown that GlauCAT detects meaningful differences across disease stages and integrates smoothly into clinical workflows, with 95% of patients finding it easy to use.
- The Wilmer Eye Institute in Baltimore is conducting the first comprehensive GlauCAT assessment in a US population. The study is also examining how demographic factors shape the patient experience beyond disease severity alone.

Notably, some domains, including ocular comfort and treatment convenience, did not differ by severity.[2] These findings highlight that glaucoma's impact varies across QOL dimensions and may reflect patients' adaptation over time.

CURRENT RESEARCH

At the Wilmer Eye Institute in Baltimore, we are conducting the first comprehensive 12-domain GlauCAT assessment in US patients to capture QOL dimensions not previously evaluated in this population, including driving ability, economic impact, and light sensitivity.

Our study is also examining whether demographic factors such as employment status, education, and race independently influence QOL beyond what disease severity alone would predict. Early observations suggest they do, which raises important questions about how social determinants of health shape how patients experience glaucoma.

We are also comparing administration methods, including in-office, at-home, and telephone formats, to determine which is the most effective in clinical settings. These findings will help guide practical implementation for clinics that consider adopting GlauCAT.

DEMOGRAPHIC FACTORS

Beyond disease severity, our research so far indicates that demographic characteristics independently influence QOL outcomes. After controlling for visual field severity, employment status, education level, age, and race have all shown significant associations with specific domains.

For instance, working patients have demonstrated better scores in the social functioning and economic impact domains, whereas older patients have paradoxically reported better scores in the treatment convenience and health concerns domains—possibly reflecting decades of coping strategy development. Black patients have shown lower scores in several domains compared with White patients, which is consistent with documented disparities in glaucoma care access and outcomes.

These findings underscore that patient-centered glaucoma care must consider the whole person, not just their disease severity.

IMPLEMENTATION IN CLINICAL PRACTICE

The Massachusetts Eye and Ear Infirmary pilot study demonstrated smooth integration of the assessment into busy clinic workflows.[3] Of 216 patients, 89% agreed to participate, 80% completed the testing independently, and most finished all six domains in just over 8 minutes. This is a brief enough time frame to allow testing to be completed by patients in the waiting room before seeing a physician. Patient satisfaction was high: 95% found the system easy to use.

Physician feedback was similarly positive. One clinician noted that GlauCAT provided them with information about the patient's concerns in a simple format that was easy to glance at in a busy clinic. Another physician observed that the results helped identify candidates for vision rehabilitation services. At Wilmer Eye Institute, interviewer-administered and telephone formats have achieved particularly high completion rates.

CLINICAL APPLICATIONS

GlauCAT results inform clinical care in practical ways. Identifying each patient's most affected domain allows targeted intervention. Mobility concerns may prompt a referral for low vision rehabilitation services, struggles with emotional well-being may warrant a referral for counseling, and impaired driving ability can guide discussions about occupational therapy.

Understanding which dimensions matter most to each patient also supports shared decision-making. An individual who prioritizes treatment convenience might benefit from a discussion of surgical options that could reduce their medication burden. A patient who struggles with light sensitivity might benefit from interventions that preserve contrast sensitivity. As health care places greater emphasis on value-based care, GlauCAT provides standardized outcomes to track intervention effectiveness and benchmark care quality across providers.

OUTLOOK

Future research will assess how QOL domains change longitudinally with disease progression and treatment. For example, it will examine whether interventions such as MIGS improve specific domains such as treatment convenience or general well-being. By understanding not only what patients see on a visual field test but also how glaucoma affects their daily lives, clinicians can deliver care that optimizes the outcomes that matter most to those living with this disease. ■

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