

Vision-related Quality of Life in Congolese Patients with Glaucoma

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ABSTRACT

Purpose: To assess the vision-related quality of life (QoL) in Congolese patients with glaucoma and its associated factors.

Methods: Ninety-four patients with open-angle glaucoma and 42 age-matched controls were included in the study. QoL was evaluated using the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25). QoL scores were compared between patients and controls. Correlation analysis was run to assess the association of QoL scores with visual function measures. Multivariate linear regression analyses were used to identify demographic and clinical factors that independently predict the overall QoL and its subdomains.

Results: The QoL composite score (QoL-CS) of glaucoma patients (60.2 ± 30.5) was 31.7% lower than that of controls (87.9 ± 9.5), $p < 0.001$. QoL subdomain scores were also significantly lower in glaucoma patients than controls (all $p < 0.001$), with a reduction rate oscillating between 16.5% for color vision and 61.1% for general health. Best-corrected visual acuity (BCVA) of both better seeing eye (BSE) and worst seeing eye (WSE) correlated significantly with QoL-CS (variance: 50.4% and 42.3%, respectively). The correlations of QoL-CS with BSE (variance: 12.9%) and WSE (variance: 16.8%) visual field MD were also significant, but the strengths were weaker than those of BCVA. Every increase of BSE's BCVA by one line improved QoL-CS by 43.4.

Conclusion: Vision-related quality of life in glaucoma patients is significantly impaired in Congolese patients with glaucoma, starting in the early stage of the disease. BCVA of the BSE emerged as an independent significant predictor of overall QoL and most of its components.

Keywords: Congolese, Glaucoma, NEI VFQ-25, Quality of life.

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INTRODUCTION

Glaucoma is a chronic and slowly progressing multifactorial degenerative optic neuropathy whose main risk factor is elevated intraocular pressure (IOP). The main histopathological expression of the disease is the degeneration of retinal ganglion cells and their axons. These attributes translate clinically as structural changes (i.e., progressive cupping of the optic disk, neuroretinal rim thinning) with topographically corresponding visual field deficits. If left untreated or inadequately treated, patients ultimately go blind. Effective treatments exist, not to reverse structural and functional damages, but only to reduce IOP and slow the disease progression and preserve visual function.

The number of people with glaucoma and related visual loss worldwide makes glaucoma a disease of public health concern.¹ Recent estimates have predicted that the global number of people with glaucoma will increase progressively over the next two decades. During that period, glaucoma prevalence will remain higher in people of African origin than those of other heritages.² The current prevalence of glaucoma in sub-Saharan Africa (SSA) has been estimated to vary between 4.2% and 4.5%.¹⁻³ Such rate for the Democratic Republic of Congo (DRC) has been estimated at 2.2% in a population-based study conducted in a rural area.⁴

The chronic and potentially blinding nature of glaucoma as well as the irreversibility of the related vision loss are known to have a negative impact on patients' quality of life (QoL).⁵⁻⁷ This should be particularly true among Blacks in whom glaucoma often occurs at a younger age, responds poorly to treatment and has an aggressive course rapidly leading to blindness compared to whites.⁸⁻¹⁰ However, only a few studies have evaluated QoL of glaucomatous patients in SSA,¹¹⁻¹⁵ none of which has been reported from the

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DRC. Understanding how glaucoma affects QoL is important both clinically and from the disease management standpoint, particularly in SSA countries where the large majority of patients are unaware they have the disease,¹⁶ have a late initial presentation to hospital, show poor compliance to treatment and follow-up, and do not have access to either vision rehabilitation services or public assistance for the visually impaired. This study was designed to compare the QoL of Congolese glaucoma patients and nonglaucomatous controls and to determine factors that are associated with QoL and its subdomains.

PATIENTS AND METHODS

Patients

Study participants were enrolled consecutively in the Department of Ophthalmology of the University Hospital of Kinshasa, from October

2018 to July 2019 following study approval by the Kinshasa School of Public Health Institutional Review Board. Informed consent was obtained from all participants and the study complied with the tenets of the Declaration of Helsinki. Patients were included if they were 18 years or older and had the diagnosis of open-angle glaucoma. Glaucoma was diagnosed in the presence of characteristic changes to the optic disk (i.e., cupping, large cup-to-disk ratio, cup-to-disk ratio asymmetry ≥ 0.2 between eyes, disk hemorrhage, rim notching, and nerve fiber layer thinning defect) and visual field defect on standard automated perimetry (SAP). Controls were age-matched subjects free of glaucoma and with a best corrected distance visual acuity (BCVA) of 0.6 or better in both eyes. Both glaucoma patients and controls were excluded if they had current or a history of retinal disease, treatment that is known to cause retinopathy and/or optic neuropathy, intraocular surgery except for uncomplicated cataract surgery, uncomplicated glaucoma surgery (for glaucoma patients only) at least 6 months prior to study enrollment.

Visual Impairment and Blindness

Visual acuity (Snellen scale) was measured monocularly on a Monoyer chart. Unilateral visual impairment was defined as BCVA worse than 0.4 in the worse eye and 0.4 or better in the fellow eye. Bilateral visual impairment was defined as BCVA worse than 0.4 in the better eye. Normal vision was defined as BCVA equals to or better than 0.6 in both eyes.¹⁷

Optical Coherence Tomography and Visual Field Testing

Optical Coherence Tomography (OCT) and visual field testing were performed in glaucomatous patients only. Optic disk scans were obtained with Topcon OCT instrument using the 200 × 200 optic disk cube protocol for peripapillary RNFL thickness measurement. All OCT scan results were carefully reviewed and only data from those with signal strength ≥ 6 , and without signs of motion, blinking or decentration artifacts, or segmentation error, were included in the statistical analyses. RNFL thickness parameters included average thickness and the thickness of temporal, superior, nasal, and inferior

quadrants. Patients also underwent standard automated perimetry with Humphrey Field Analyzer (HFA, Carl Zeiss Meditec, Dublin, CA) using the 24–2 test pattern of Swedish interactive threshold algorithm (SITA) standard.

Quality of Life Assessment

QoL was assessed using the French version of the NEI–VFQ–25. This tool evaluates QoL in patients with various eye diseases through 25 questions that explore the following 12 vision-related domains: general health (question 1), general vision (question 2), ocular pain (questions 4 and 19), near activities (questions 5–7), distance activities (questions 8, 9, and 14), role difficulties (questions 17 and 18), mental health (questions 3, 21, 22, and 25), social function (questions 11 and 13), dependency (questions 20, 23, and 24), driving (questions 15c, 16, and 16a), color vision (question 12), and peripheral vision (10). The NEI–VFQ–25 composite score (CS), referred to herein as QoL–CS, was generated by averaging the scores of the 12 domains; it ranges from 0 (worst-seeing possible function) to 100 (better-seeing possible function).¹⁸

Statistical Analysis

Data were analyzed with SPSS version 26.0. Descriptive statistics were summarized as frequencies and percentages for categorical variables and mean and standard deviation for continuous variables. Independent samples *t*-test were used to compare continuous variable means between groups. Proportions were compared with Pearson Chi-square. Correlations between QoL scores and better-seeing eye (BSE) and worst-seeing eye (WSE) BCVA, visual field mean deviation (MD), and RNFL thickness were assessed with Pearson correlation coefficients. We used Evans' scale to categorize the strength of the correlation into very weak ($r = 0-0.19$), weak ($r = 0.2-0.39$), moderate ($r = 0.4-0.59$), strong ($r = 0.6-0.79$), and very strong ($r = 0.8-1.0$).¹⁹ A multiple regression analysis was performed with QoL composite score (QoL-CS) score as dependent variable and sex, age, BCVA, IOP, cup-to-disk ratio (CDR), visual field MD and rim area of BSE and WSE, and systemic comorbidities (diabetes, hypertension) as explanatory variables.

Table 1: Demographic and clinical characteristics of participants

Variables	Controls	P_1	Glaucoma	P_2	P_3
Females, %	42.9	0.17	54.3	0.24	0.22
Males, %	57.1		45.7		0.22
Mean age, years	64.1 ± 5.1		58.9 ± 16.8		0.063
BSE BCVA	0.84 ± 0.15	<0.001	0.68 ± 0.32	<0.001	0.002
WSE BCVA	0.76 ± 0.15		0.46 ± 0.40		<0.001
Binocular BCVA	1.14 ± 0.19		0.85 ± 0.45		<0.001
BSE IOP, mm Hg	15.1 ± 2.7	0.83	19.4 ± 7.0	0.10	<0.001
WSE IOP, mm Hg	15.1 ± 2.5		20.5 ± 9.1		<0.001
BSE CDR	0.26 ± 0.11	0.82	0.65 ± 0.21	0.07	<0.001
WSE CDR	0.26 ± 0.11		0.69 ± 0.20		<0.001
BSE rim area, μm^2	–		1.31 ± 0.61	0.18	–
WSE rim area, μm^2	–		1.16 ± 0.51		–
BSE visual field MD, dB	–		-7.7 ± 6.5	0.02	–
WSE visual field MD, dB	–		-10.8 ± 9.3		–

RESULTS

Demographic and Clinical Features of Study Participants

There were 94 patients with glaucoma and 42 controls; their demographic and clinical attributes are given in Table 1. The proportion of men in the two groups was comparable ($p = 0.22$), as was that of women ($p = 0.22$). Men and women were proportionally similar in each group ($\chi^2 = 1.7$; $p = 0.17$ for controls and $\chi^2 = 1.38$; $p = 0.24$ for glaucoma patients). Controls had slightly better BCVA, higher IOP, and smaller CDR in both the BSE and WSE than glaucoma patients (all $p < 0.05$). No statistical significant differences were observed with regard to IOP and CDR of BSE and WSE of controls or glaucoma patients (all $p > 0.05$).

Quality of Life Scores of Glaucoma Patients and Controls

The QoL-CS and QoL subdomain scores were significantly lower in glaucoma patients than controls (all $p < 0.001$). Relative to controls, glaucoma patients had a 31.7% reduction of the QoL-CS. The reduction rate of QoL subdomain scores ranged between 16.5% (color vision) and 61.1% (general vision), indicating that color vision and general vision were the least and most affected, respectively (Table 2). After stratification of glaucoma patients into early, moderate, and advanced based on visual field MD of the BSE, only patients with moderate and advanced disease had significantly lower QoL-CS than controls ($p = 0.003$ and <0.001 , respectively), Figure 1. When the stratification was based on the MD of the WSE, QoL-CS decreased with disease worsening but reached statistical significance only in advanced glaucoma ($p < 0.001$), Figure 1. In both stratifications, no differences were observed in QoL-CS between early and moderate glaucoma or between moderate and advanced glaucoma. For QoL subdomains, restricting the comparison to control vs patients with early glaucoma based on BSE revealed that only general vision, role difficulties, and mental health were significantly impaired. The scores were reduced by 52.7%, 23.7%, and 19.4%, respectively. A similar comparison based on WSE showed that in addition to the same three components (score reduction rates of 51.5%, 27.6%, and 21.1%, respectively), near vision was also impacted significantly (reduction rate: 17.6%).

QoL Scores and Vision in Glaucoma Patients

Figure 2 depicts clustered bars of QoL scores of patients with normal vision, unilateral, and bilateral visual impairment.

Patients with normal vision outscored those with unilateral visual impairment on the overall QoL (79.4 ± 17.4 vs 48.7 ± 28.7 , $p < 0.001$) and all subdomains ($p < 0.05$), except color vision ($p = 0.23$). Patients with normal vision also had significantly higher scores on all QoL measures than those with bilateral visual impairment (all $p < 0.001$). Similarly, unilateral visual impairment was associated with higher scores than bilateral visual impairment, but the difference was not statistically significant for general health ($p = 0.72$), near vision ($p = 0.39$), ocular pain ($p = 0.12$), and role difficulties ($p = 0.13$).

Association of QoL with Ocular Parameters in Glaucoma Patients

QoL-CS correlated strongly with BCVA of both BSE ($r = 0.71$, $p < 0.001$) and WSE ($r = 0.65$, $p < 0.001$). Except for a weak but significant correlation between general health and BCVA of BSE and between ocular pain and BCVA of WSE, the correlation was also significant for all other QoL subdomains and ranged between moderate and strong ($r = 0.47$ – 0.67 for BSE and 0.43 – 0.66 for WSE, all $p < 0.001$), Table 3. Significant correlation was observed between all QoL scores and binocular BCVA ($p < 0.001$). The correlation of QoL with binocular BCVA was strong for overall QoL ($r = 0.74$) and moderate to strong for QoL subcomponents ($r = 0.44$ – 0.72), all $p < 0.001$. QoL-CS and IOP of both better-seeing and WSE correlated weakly ($r = -0.38$, $p < 0.001$ and $r = -0.25$, $p = 0.017$, respectively). Apart from general vision, all QoL subdomains also showed a weak to moderate correlation with IOP of BSE ($r = -0.44$ to -0.30 , all $p < 0.05$). For the WSE, significant weak correlations with IOP were observed only for mental health, ocular pain, social functioning, role difficulties, dependency, and peripheral vision; the coefficients oscillated between -0.26 and -0.24 (all $p < 0.05$). The correlation between QoL-CS and CDR was significant but weak for both BSE ($r = -0.39$, $p < 0.001$) and WSE ($r = -0.38$, $p < 0.001$). All QoL subdomains also correlated weakly with CDR of BSE ($r = -0.18$ to -0.38 , all $p < 0.05$) and WSE 9 ($r = -0.28$ to -0.37 , all $p < 0.05$). However, general health and ocular pain did not correlate with CDR of BSE and CDR of WSE, respectively. There was a weak correlation between QoL-CS and visual field MD of BSE ($r = 0.36$, $p = 0.005$). Such correlation was moderate for WSE ($r = 0.41$, $p < 0.001$). No correlation was found between general vision or ocular pain and visual field MD of WSE. Likewise, general health, general vision, distance vision, social functioning, color vision, and limitations did not correlate with visual field MD of BSE.

Table 2: Quality of life scores of glaucoma patients and controls

Dimensions*	Controls	Glaucoma	Reduction rate (%)	<i>p</i>
QoL-CS	87.9 ± 9.5	60.2 ± 30.5	31.7	<0.001
General health	61.9 ± 20.1	42.8 ± 32.9	30.9	<0.001
General vision	93.2 ± 9.7	36.3 ± 35.9	61.1	<0.001
Mental health	89.4 ± 14.1	51.6 ± 38.3	42.3	<0.001
Ocular pain	89.6 ± 15.4	70.5 ± 30.9	21.3	<0.001
Near vision	86.5 ± 15.2	59.6 ± 32.3	31.1	<0.001
Distance vision	89.5 ± 14.9	65.1 ± 33.0	27.3	<0.001
Social functioning	86.3 ± 22.2	68.2 ± 35.5	21.0	<0.001
Color vision	98.7 ± 8.0	82.4 ± 32.2	16.5	<0.001
Role difficulties	92.9 ± 12.7	50.7 ± 42.9	45.4	<0.001
Dependency	95.6 ± 10.3	61.6 ± 42.5	35.6	<0.001
Peripheral vision	100.0 ± 0.0	70.8 ± 35.0	29.2	<0.001

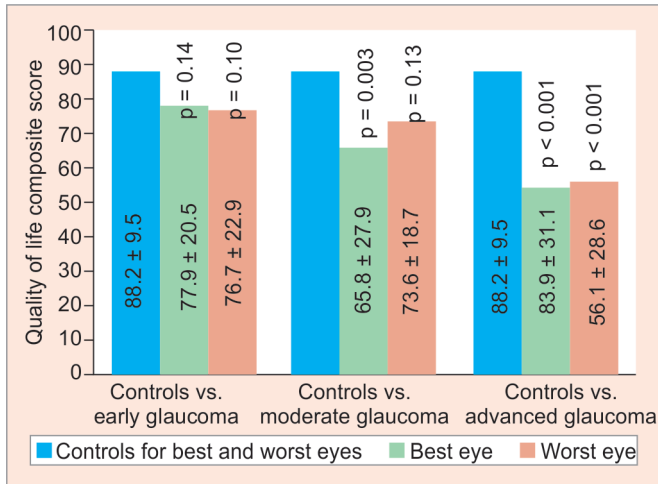


Fig. 1: Bar representation of the comparison of mean quality of life composite score between controls and patients with early glaucoma, controls and patients with moderate glaucoma, and controls and advanced glaucoma, controls and patients with early, moderate and advanced glaucoma in better- and worst-seeing eye

Multiple regression analysis revealed a significant association between QoL-CS and BCVA of BSE (β : 43.4, 95% CI: 13.5–73.3, $p = 0.006$), as shown in Table 4. BCVA of BSE was also associated with general health, general vision, mental health, social functioning, and dependency (all $p < 0.05$). Age also independently influenced general health, near vision, and role difficulties (all $p < 0.05$). Color vision and ocular pain were not associated with any of the factors investigated.

DISCUSSION

The current diagnosis of glaucoma is based on the identification of structural damage and functional deficits. Assessment of glaucoma treatment success remains focused on monitoring IOP level as well as structural and functional parameters. Like for many other diseases, the caveat for this approach is that the management is solely centered on biomedical endpoints, ignoring the impact the disease and/or its treatment may have on the patient’s overall well-being and perception of his own life. In this study, we used a hospital-based case-control design to evaluate the impact of glaucoma on QoL measured with the NEI-VFQ-25.

Glaucoma patients showed a significant 31.7% reduction of the QoL-CS and 16.5%–61.1% reduction of QoL subscale

Table 3: Correlation of visual acuity, cup-to-disk ratio, and visual field mean deviation with quality of life scores

Dimensions	BCVA		CDR		Visual field MD	
	BSE	WSE	BSE	WSE	BSE	WSE
QoL-CS	0.71 (<0.001)	0.65 (<0.001)	-0.39 (<0.001)	-0.38 (<0.001)	0.36 (0.005)	0.41 (0.001)
General health	0.55 (<0.001)	0.60 (<0.001)	-0.18 (0.11)	-0.31 (0.004)	0.23 (0.071)	0.26 (0.003)
General vision	0.39 (<0.001)	0.43 (<0.001)	-0.29 (0.011)	-0.37 (<0.001)	0.11 (0.39)	0.05 (0.70)
Mental health	0.66 (<0.001)	0.62 (<0.001)	-0.34 (0.001)	-0.36 (<0.001)	0.35 (0.006)	0.31 (0.012)
Ocular pain	0.47 (<0.001)	0.31 (0.003)	-0.12 (0.087)	-0.17 (0.074)	0.31 (0.016)	0.23 (0.07)
Near vision	0.66 (<0.001)	0.66 (<0.001)	-0.33 (0.002)	-0.34 (0.001)	0.34 (0.003)	0.33 (0.008)
Distance vision	0.64 (<0.001)	0.64 (<0.001)	-0.30 (0.006)	-0.35 (0.001)	0.21 (0.11)	0.43 (<0.001)
Social functioning	0.66 (<0.001)	0.56 (<0.001)	-0.29 (0.008)	-0.28 (0.01)	0.25 (0.058)	0.58 (<0.001)
Color vision	0.56 (<0.001)	0.45 (<0.001)	-0.32 (0.004)	-0.36 (0.001)	0.14 (0.30)	0.31 (0.017)
Limitations	0.49 (<0.001)	0.50 (<0.001)	-0.22 (0.045)	-0.28 (0.01)	0.24 (0.067)	0.29 (0.020)
Dependency	0.67 (<0.001)	0.59 (<0.001)	-0.38 (<0.001)	-0.34 (0.002)	0.32 (0.001)	0.29 (0.017)
Peripheral vision	0.54 (<0.001)	0.64 (<0.001)	-0.34 (0.002)	-0.28 (0.014)	0.26 (0.047)	0.33 (0.009)

Table 4: Factors associated with quality of life in glaucoma patients

Dimensions	Factors	β (95% CI)	Variance (%)	p
QoL-CS	BSE BCVA	43.4 (13.5–73.3)	54.1	0.006
General health	BSE BCVA	45.3 (10.6–79.9)	55.0	0.006
	Age	-0.77 (-1.4–0.14)		0.018
General vision	BSE BCVA	52.4 (6.1–98.8)	44.7	0.028
Mental health	BSE BCVA	66.7 (29.8–103.7)	52.1	0.001
Near vision	Age	-0.66 (-1.3–0.05)	50.4	0.035
Distance vision	WSE IOP	1.6 (0.4–2.9)	51.2	0.010
Social functioning	BSE BCVA	38.6 (3.3–73.9)	54.7	0.033
	WSE MD	1.9 (0.8–3.1)		0.002
Role difficulties	Age	-1.24 (-2.3–0.15)	28.7	0.026
Dependency	BSE BCVA	74.5 (34.3–114.7)	56.7	0.001
Peripheral vision	WSE IOP	1.9 (0.6–3.1)	49.1	0.004

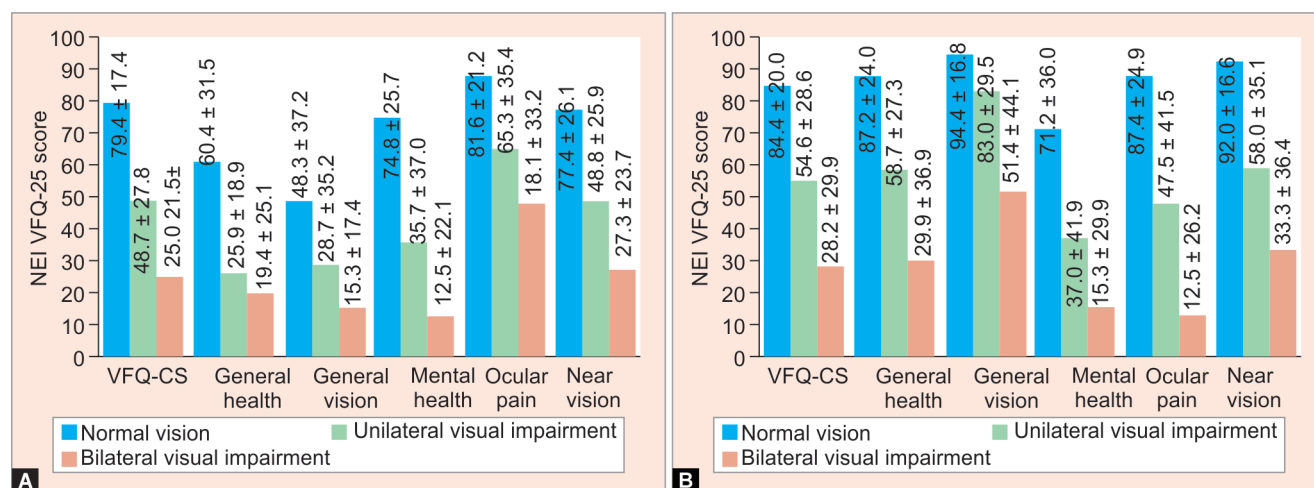


Fig. 2: Bar representation of mean quality of life scores in glaucoma patients with normal vision, unilateral, and bilateral visual impairment

scores relative to controls, indicating that QoL as a whole and each of its dimensions were significantly impaired. Significant reduction of overall QoL has been reported previously in other case-control studies that used the NEI VFQ-25, but their reduction rates were lower than ours, oscillating between 7.3% and 38.3%.^{15,20-23} When compared specifically to overall QoL levels of Brazilian,²⁴ Dutch,²⁵ Greek,²⁶ Italian,²⁷ Japanese,²⁸ Chinese,²⁹ and American cohorts³⁰ our patients had scores suggesting a lower QoL. The greater QoL deterioration in our patients is likely the result of a combination of factors, including (1) low socioeconomic status for most patients, (2) glaucoma is more aggressive and refractory to conventional treatment,⁸⁻¹⁰ low awareness of the disease, and late presentation for the initial visit.

Unlike our findings where all QoL subscale scores were significantly reduced, the reduction was not statistically significant for general vision, social functioning, ocular pain, distance vision, and color vision in Chaturvedi and Chaturvedi's study²¹ and for general vision, near vision, driving, and color vision in Kumari et al's study.²² While color vision was the least affected QoL subscale in the present study and most of the previous ones,^{15,21,22,24,26,27,29,31-34} there were variations across studies regarding the two most affected domains: general vision (61% reduction) and role difficulties (45.4%) in the present study vs driving (31.8%) and mental health (32.1%) in Chaturvedi and Chaturvedi's sample,²¹ driving (29.8%) and role difficulty (14%) in a Nigerian cohort,¹⁵ mental health (26.1%) and general health (25.2%) in Kumari's study,²² and mental health (63.3%) and general vision (56.5%) in Kausar's series.²³ In other investigations the reduction rate could not be determined due to the lack of control groups, but the most affected domains were driving and general vision,^{29,30} role limitations, and general health,³³ general health and general vision,^{27,31,32,34,35} ocular pain and mental health,²⁴ and driving and general health.³⁶ These dissimilarities are likely reflecting differences in study participants, particularly regarding glaucoma characteristics (i.e., disease stage, rate of progression, treatment or not), associated ocular and extraocular conditions, availability of support system, and interindividual difference in coping mechanisms.

In patients with eye diseases, QoL is believed to be driven at least in part by vision level. One way to verify this is to compare QoL in people with different levels of vision. Such comparison in the present study revealed that QoL of glaucoma patients with unilateral and that of those with bilateral visual impairment was

deteriorated by 38.7% and 68.5% relative to controls, respectively. Glaucoma patients with bilateral visual impairment also had a QoL 48.7% worse than that of patients with unilateral impairment. Thus, glaucoma patients suffer significant QoL deterioration irrespective of unilateral or bilateral visual impairment. Practically, glaucoma patients with unilateral visual impairment should already benefit from rehabilitation measures aimed at optimizing the use of residual vision, teaching them ways to enhance visual functioning in daily life, and adapting to permanent ongoing vision loss. These skills have the potential to improve patients' social independence. Another way of assessing whether vision-related QoL is associated with vision level is to stratify patients based on disease severity and compare their QoL scores. Doing so showed that QoL worsened progressively from controls to advanced glaucoma, but no significant difference was observed between patients with early glaucoma and controls regardless of BSE or WSE. Our observation concurs with findings reported earlier by others with both the NEI VFQ-25 and the Glaucoma Quality of Life-15 (GQL-15) scales,^{13,37} with the difference that BSE and WSE were not analyzed separately in those studies. The lack of statistical difference between early glaucoma and controls does not necessarily suggest normal QoL in the former group, as evidenced by their reduced QoL-CS (Fig. 1). Again, if intervention is needed to prevent, slow, or improve QoL, it should start in early glaucoma along with antiglaucoma therapy.

Earlier studies have suggested that rather than testing the correlation of QoL with ocular parameters of one eye chosen randomly or each eye separately, it is better to assess the correlation separately with the BSE and WSE. It emerges from those studies that QoL-CS correlates significantly with BCVA, visual field MD, and CDR of both BSE and WSE,^{15,20,29,32,36,38,39} which is corroborated by our observations. However, BCVA of BSE was more impactful on QoL than BCVA of WSE whereas it was the opposite for visual field MD. This observation is not surprising given the significant difference in BCVA between BSE and WSE. Because patients with glaucoma often have a BSE and WSE, it is tempting to assume that the WSE will account for more vision-related QoL loss. However, it is possible that coping mechanisms developed by patients play a role in limiting the impact of WSE. The other plausible explanation that may fit our observation is the visual inhibition phenomenon, which often occurs when there is a substantial difference in vision between BSE and WSE. Indeed, both BCVA and visual field MD were significantly better in BSE than WSE, which may have prevented

visual summation and forced the patients to use only the BSE.⁴⁰ It is therefore understandable that in these circumstances functional change in BSE becomes more influential on QoL than change affecting the WSE. Because the threshold of functional difference triggering binocular inhibition may vary from one patient to another and is generally difficult to determine, it is important that visual function be preserved in the WSE. This is because BSE, regardless of whether it is diseased or not, may fail to adequately compensate for the WSE. We also noted that BSE and WSE BCVA explained 50.4% and 42.3% of QoL variance, respectively, vs 13.0–16.8% for the other ocular parameters. Thus, first, BCVA was the most impactful ocular parameter. Second, IOP, despite being the most important risk factor for glaucoma, only accounted for 14.4% and 6.3% of QoL variance based on BSE and WSE, respectively. As a corollary, reducing IOP alone will not suffice to prevent QoL deterioration. Third, there are other factors that account for QoL variance. These may be disease-specific (i.e., degradation of contrast sensitivity, scotomas, impairment of depth perception, the deficit in peripheral vision) and/or nondisease-related (i.e., loss of or fear of losing sight and independence, the financial burden of clinical care, socioeconomic standing). This is further supported by the fact that binocular BCVA only counted for 54.8% of QoL variance.

One question that has been debated in the literature is which of BSE and WSE visual function is determinant of vision-related QoL in potentially blinding diseases. We found that overall QoL was associated with BCVA of BSE only. Specifically, our findings suggested that a one unit increase in visual acuity of the BSE would improve QoL by 43.4. While it is conceivable to think that BCVA of the WSE would affect QoL and its components more than BCVA of BSE, our findings revealed the opposite. In fact, BCVA of BSE was a significant determinant of 5 (general health, general vision, mental health, social functioning, and dependency) of the 11 subdomains we investigated. Conversely, none of the subdomains was associated with BCVA of WSE. As mentioned earlier, glaucoma is often asymmetric, leaving patients with one BSE and one WSE, raising the possibility of binocular inhibition. Unsurprisingly, age significantly influenced general health, near vision, and role difficulties. Although age significantly correlated with scores of all QoL subdomains, it was only associated with general health, mental health, and social functioning. As patients age, the likelihood of age-related diseases increases, which in turn contributes to the general health decline. The same explanation may hold for the inability of patients to accomplish daily tasks.

This study is an initial assessment of vision-related QoL in Congolese patients with glaucoma. The findings should be interpreted with some caution as a result of some limitations. First, because the sample size was relatively small and study participants recruited at a single referral eye unit, the generalizability of the findings may be limited. Second, QoL is a multifactorial concept impacted by numerous factors. Unlike other studies,^{15,26,27,31,41,42} clinical information such as the number of medications (i.e., IOP-lowering drops and medications for general and other ocular comorbidities) and socioeconomic factors (i.e., education level, marital status, employment status, occupation, household income, and availability of medical insurance) were not investigated and therefore their contribution is unknown in this study. However, it is recommended that these factors be taken into consideration in the management of QoL of these patients. Despite the limitations, the case-control design provides assurance that QoL is truly impaired in glaucoma patients.

To summarize, vision-related QoL is impaired in Congolese patients with glaucoma. The impact is more pronounced on general vision, role difficulties, and mental health. While there is a correlation between vision and QoL, BCVA of the BSE emerged as the most impactful parameter. Measures to improve QoL in Congolese patients with glaucoma should start in the early stages. Assessment of vision-related QoL is easy and the possibility of its integration into the management of glaucoma should be explored in this setting.

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