Vision-related quality-of-life in Jamaican glaucoma patients at Kingston Public Hospital

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Abstract

• AIM: To determine the vision-related quality-of-life of glaucoma patients and the association between clinical and socioeconomic factors, and vision-related quality-of-life.
• METHODS: This was a cross-sectional study. Consecutive patients with glaucoma were interviewed using a modified 25-item National Eye Institute Visual Function Questionnaire (VFQ-25) by a single interviewer. Statistical analysis was done to find associations between patient variables and vision-related quality-of-life scores. Confidentiality and anonymity were maintained.
• RESULTS: Ninety-six participants were recruited in the study. There were 44 males and the mean age for males and females was 65.7 and 69.5y, respectively. The mean composite score was 71.2 (with a maximum possible score of 100), with the highest mean score in the colour vision subscale (89.8) and the lowest mean score in the driving subscale (34.0). Worse visual acuity (P<0.001), longer duration of glaucoma (P<0.001) and higher number of glaucoma medications (P<0.001) were associated with a worse composite score. Female participants and those who lived in urban areas had significantly better scores than male participants (P=0.002) and those who lived in rural areas (P=0.017), respectively.
• CONCLUSION: The vision-related quality-of-life in Jamaican glaucoma patients is comparable to that of glaucoma patients in the Barbados Eye Study and other international studies using the VFQ-25 questionnaire. Worse quality-of-life scores are associated with poorer visual acuity, longer duration of glaucoma, more glaucoma medications, and sociodemographic factors such as male gender and rural residence.
• KEYWORDS: glaucoma; health-related quality-of-life; Jamaica; life quality; vision

INTRODUCTION

Primary open angle glaucoma (POAG) is the most common type of glaucoma and has been reported as being a major cause of blindness in Jamaica since the 1950s[1]. The Barbados Eye Study found the prevalence of POAG to be 7.0% versus 0.8% in black and white participants, respectively[2]. Black patients with glaucoma are 4 times more likely to go blind, more likely to be diagnosed at a younger age and likely to have more advanced disease at presentation than their white counterparts[3]. Quality of life in glaucoma has been measured mostly with the use of self-report questionnaires and to a lesser extent with performance-based studies[4]. Vision-related quality of life (VRQoL) may be defined as a person’s satisfaction with their visual function and its effect on daily life, and this may be negatively impacted by glaucoma-related visual impairment[5]. Studies have found associations between health-related or VRQoL scores and multiple factors in glaucoma patients including visual acuity[6-11], visual field status[6,8,10,12-16], optical coherence tomography[17], visual symptoms[18], rate of glaucoma progression[19], and socio-economic factors such as age, marital status, literacy, and place of residence[20].

The number of QoL studies in glaucoma has increased since the early 1990’s however, there are still fewer QoL studies in glaucoma than in other disabling chronic diseases[5]. With review of the literature, the Barbados Eye Study is the only study to date that measured the VRQoL in glaucoma patients in a predominantly Afro-Caribbean population and no previous study has been conducted in Jamaica. QoL measures in these patients are of particular importance because of the more aggressive disease course and higher risk of blindness in this population. In this study we examined the VRQoL of Jamaican patients using the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25) which is a VRQoL self-report questionnaire with high validity and reliability[21].
**SUBJECTS AND METHODS**

**Ethical Approval** Received from the University of the West Indies Faculty of Medical Sciences Ethics Committee (ECP 246, 19/20) and the Ministry of Health and Wellness Ethics Committee, Kingston, Jamaica. The study was carried out in accordance with the principles outlined in the Declaration of Helsinki.

**Patient Selection and Sampling** This was a cross-sectional study conducted at the ophthalmology clinic of the Kingston Public Hospital (KPH). The KPH is a major tertiary institution in the capital city of Kingston, Jamaica which receives island-wide ophthalmology referrals. Patients with a pre-existing diagnosis of glaucoma presenting to the KPH ophthalmology clinic for their routine clinical appointments were identified. Glaucoma diagnosis was based on structural optic disc changes on fundoscopy and characteristic visual field defects on automated threshold perimetry.

Consecutive patients greater than 18 years old with glaucoma and able to give written informed consent were invited to be a part of the study. Patients with concurrent macular pathology, media opacities (cataracts), cognitive, hearing or mobility impairment or a recent history of intraocular surgery (three months) were excluded. A sample size of 75 patients was needed to give the study a power of over 90%.

**Data Collection** Participants underwent a 15-minute interview conducted by a single, trained interviewer (Jordan VA). Data was collected on age, gender, marital, educational, and employment status, glaucoma duration, best-corrected visual acuity, visual field global indices, antiglaucoma medications and previous eye surgery. The interview was done with a modified version of the NEI VFQ-25 for easier understanding in our Jamaican culture. The scoring system was maintained.

**Data Entry and Statistical Analysis** All visual acuities were converted to the logMAR equivalent and visual acuities of counting fingers (CF), hand motions (HM), light perception (LP) and no light perception (NLP) were converted to logMAR counting fingers (CF), hand motions (HM), light perception (LP) and no light perception (NLP) were converted to the logMAR equivalent and visual acuities of.

Participants' answers in the modified VFQ-25 were converted to subscale and composite scores in accordance with the scoring instructions. Linear regression analyses were performed to quantify the associations between quantitative variables and QoL scores. The independent samples t-test and ANOVA were used to test for an association between QoL scores and categorical variables. The Chi-square test was used to look for associations between categorical variables (SPSS Statistics 28).

**RESULTS**

**Participant Characteristics** Ninety-six patients were recruited. Their ages ranged from 38 to 95 years old with a mean of 67.4±11.5y. There were 54.2% females (52/96) and 45.8% males (44/96). All participants were of African descent and had a diagnosis of POAG.

Many participants, 54/96 (56.3%), were retired and the majority, 76/96 (79.2%), of participants reported having a monthly household income of approximately <$340 United States dollars (USD). No participants reported a household income of >$1700. Slightly more than half of the participants had completed at least primary school education (52.1% or 50/96) and 44 (45.8%) possessed up to a secondary school education. Most participants (60/96 or 62.5%) resided in an urban location.

Participants’ duration since glaucoma diagnosis ranged from one year to 40y with a mean of 8.52±8.43y. Visual acuity ranged from 0 to 3.0 logMAR with mean visual acuities of 0.39 in the better eye and 1.03 in the worse eye. Twenty-three patients (24.0%) were blind in one eye and 7 (7.3%) were bilaterally blind.

Patients were on a mean of 2.1 glaucoma drugs (range from 1 to 5) with most (41/96 or 42.7%) only on monotherapy and 24 patients (25.0%) on dual therapy. Amongst the participants, 11 (11.5%) had a history of selective laser trabeculoplasty (SLT) and 3 (3.13%) had a history of augmented trabeculectomy in at least one eye.

Only 27.1% of patients (26/96) had a Humphrey visual field test done within the prior two years and only 17.7% (17/96) had one documented within the previous year. For those patients who had a documented visual field within 1y the mean visual field index was 48%±5.66% (range 2% to 100%) and the average mean deviation was -15.18±10.52 (range -1.36 to -32.38) dB. A summary of the sociodemographic and medical characteristics of study participants is shown in Table 1.

**Composite and Subscale Scores** Participants had a mean composite score of 71.2 (95%CI 66.8-75.7), with a range from 16.3 to 98.8. Participants, on average, scored highest in the colour vision subscale (89.8) and lowest in the driving subscale (34.0). The general health subscale, which has no contribution to the composite score, had a mean of 47.4 and there was no statistical correlation between general health subscale scores and composite scores (Pearson correlation coefficient 0.066). Participant scores on all vision-targeted subscales are summarised in Table 2.

**Visual and Sociodemographic Correlates** There was a significant association between lower composite scores and worse visual acuity in participants’ better ($P<0.001$, $R^2=0.400$) and worse ($P<0.001$, $R^2=0.400$) eyes. For each 0.1 worsening in the logMAR visual acuity of the better or worse eye, the composite score decreased by 2.19 and 1.23 respectively ($β=\sim21.9$, $P<0.001$, $R^2=0.400$).
β=-12.3). Furthermore, patients who were blind in one eye or both eyes had significantly worse composite scores (58.9±19.7 and 30.7±13.9 respectively) and subscale scores than those who were blind in neither eye (79.7±15.8, P<0.001) with the exception for the general health subscale (Figure 1).

Significant associations were also found between lower composite scores and a longer duration of glaucoma (P<0.001, R²=0.111) and a higher number of glaucoma medications being taken (P=0.014, R²=0.063). Each additional year after being diagnosed with glaucoma was associated with a 0.87 decrease in composite score. There was no significant association between composite scores and age (P=0.21), mean deviation in the better or worse eye (P=0.12, 0.73), or visual field index in the better or worse eye (P=0.18, 0.34). Multiple subscales had statistically significant associations with the investigated variables (Tables 3 and 4).

Female participants had significantly higher composite scores (77.4±16.8) than their male counterparts (63.9±25.1, P=0.002)
with a lower extent of spread (Figure 2) and significantly better scores on all vision-targeted subscales except ocular pain and driving. Male participants also had significantly worse visual acuity than the female participants in both the better (Mean 0.63 vs 0.17 logMAR, \(P<0.001\)) and worse eye (Mean 1.60 vs 0.54 logMAR, \(P<0.001\)). There was no significant association between gender and employment status (\(P=0.092\)) or gender and education level (\(P=0.368\)).

Participants living in urban areas (75.3±19.4) had significantly higher composite scores than those living in rural areas (64.3±24.4, \(P=0.017\); Figure 3) and had significantly higher scores in the general vision (\(P<0.001\)), mental health (\(P=0.027\)), role difficulties (\(P=0.011\)) and dependency (\(P=0.010\)) subscales. Participants living in rural areas also had significantly worse visual acuities in both their better eye (mean 0.57 vs 0.28 logMAR, \(P=0.031\)) and worse eye (mean 1.33 vs 0.85 logMAR, \(P=0.040\)) than their urban counterparts. There was no significant association between location of residence and employment status (\(P=0.127\)), income level (\(P=0.482\)) or education level (\(P=0.870\)).

No association was found between composite scores and marital status (\(P=0.934\)), employment status (\(P=0.291\)) or educational level (\(P=0.742\)). A history of laser trabeculoplasty, cataract surgery or trabeculectomy also had no association with composite scores on the modified VFQ-25.

**DISCUSSION**

The VRQoL score for Jamaican glaucoma patients in our study was similar to Barbadian patients (71.2 vs 78.9 respectively)\(^2\). Similar VFQ-25 composite scores were found in glaucoma patients in the Los Angeles Latino Eye Study (LALES; mean 73.2 with visual field loss)\(^{14}\) and the Tube versus Trabeculectomy (TVT) Study (71.9±17.9 at baseline and 73.5±20.0 at 5y)\(^{24}\). Participants in the Early Manifest Glaucoma Trial were newly diagnosed with open angle glaucoma and scored a higher mean composite score of 88 at 3y\(^{25}\) suggesting that patients with early glaucoma retain a high vision-related quality-of-life and highlighting the need for early diagnosis and intervention.

The strongest associations with lower composite scores in our study were with worse visual acuity in the better or worse eye and longer duration of glaucoma. Several previous studies have noted associations between VFQ-25 composite scores and visual acuity including the EMGT\(^{25}\), TVT Study\(^{24}\), and studies by Labiris et al\(^{26}\) and Onakoya et al\(^{27}\). The negative correlations between the VRQoL and both glaucoma duration and number of glaucoma medications are in keeping with the progressive nature of glaucoma.
In published literature, associations between VRQoL and visual field parameters, particularly the mean deviation (MD) \(^{[6-7,9-10,12,24-26]}\) and pattern-standard deviation (PSD) \(^{[26]}\), have been noted, however this was not found in our data. The small proportion of study participants with recent documented visual field tests in our study makes associations with visual field parameters difficult to make, however patients were included in the study independent of whether they had recent visual field tests to avoid sampling bias. We also found no association between age and composite score in our study although this has also been found in other studies\(^{[25]}\).

Male participants in our study not only had worse QoL scores but also worse visual acuity which could explain the difference in VFQ-25 composite scores. The reasons for male participants in our study having worse outcomes than their female counterparts are unclear, but this could be caused by gender differences in health-seeking behaviour, adherence, social support, or lifestyle. Jamaican men present late for health complaints\(^{[28-29]}\), and poor attentiveness to symptoms, and poor education and knowledge of their illnesses may be contributing factors although no association between gender and education status was found in our data. Interestingly, men scored higher composite VFQ-25 scores (84.7±13.3) than women 78.7±15.5 \((P=0.042)\) in a similar Greek study\(^{[26]}\).

Place of residence also had a significant association with VRQoL in our study, with patients from rural areas having worse mean composite scores than those from urban areas. Rural patients also had significantly worse visual acuity scores. These findings are in keeping with prior studies which have demonstrated health inequity in Jamaica with rural and poor residents having worse health outcomes and insurance coverage\(^{[30-32]}\). Possible explanations include worse education and access to information, worse access to healthcare facilities and pharmacies and an inability to afford healthcare and medications. There was no significant association between location of residence, education, and income in our study. The National Survey of Blindness and Visual Impairment in Nigeria also found a negative association between self-reported visual function and living in rural areas\(^{[20]}\).

There was no association between monthly income and QoL in our study, however, most of our patients had a monthly household income below 340 USD and higher income levels were not well represented. The economic burden of glaucoma is well documented with direct costs such as medications, hospital visits, surgical and procedural costs, and transportation, and indirect costs from loss of productivity of the patients and caregivers, contributing to the problem\(^{[5]}\).

Participants who were blind in either or both eyes in our study had a higher mean general health subscale score than those blind in neither eye. The reason for this isn’t evident however this could be due to confounding factors such as personality, better healthcare or social support provided to blind patients or appreciation by blind persons for other aspects of their health. Patients in our study had slightly worse mean composite VFQ-25 scores than those previously reported in Barbadian glaucoma patients\(^{[3]}\). This could possibly be attributed to sociodemographic differences between Jamaica and Barbados despite both being islands in the Caribbean with a similar ethnicity mix. A comparison of the two countries shows that Barbados has a higher human development index (0.814 vs 0.734), with a higher gross national income per capita (14936 vs 9319 PPP in USD), literacy rate (99.6% vs 88.1%) and life expectancy at birth (79.2 vs 74.5y)\(^{[31]}\).

Based on our results, more attention should be given to male and rural Jamaican patients with glaucoma to ensure adequate access to healthcare and medications, adherence to treatment regimes, knowledge of their disease and social support. Closer monitoring of glaucoma patients with Humphrey visual fields is recommended however this is limited by a lack of resources in public hospitals and low patient income. Interventions such as augmented trabeculectomies and laser trabecuoplasties could be considered earlier to preserve visual function in glaucoma patients with documented progression. The low rate of glaucoma surgery in this population may be due to patient factors, such as cultural reluctance to surgery and lack of understanding, and a lack of training and surgical volume in filtering surgery by local surgeons.

Some limitations of this study include the use of a self-reported questionnaire which may be subject to bias, and poor recall. Patient responses in questionnaires may be affected by knowledge of their diagnosis, expectations, and psychological adaptation\(^{[41]}\). Some clinical data was prone to incompletion due to its retrospective nature. Staging of glaucoma in this study was impossible due to the limited visual field data. The cross-sectional design of this study is unable to follow changes in QoL over time. The external validity of this research may be affected by the relative uniformity of our study population with most patients being from a lower socioeconomic background.

This is the first study to examine the VRQoL of Jamaican glaucoma patients and demonstrates that the VRQoL in this group of patients is like previously published studies. This study also adds further data regarding the VRQoL in Afro-Caribbean patients, a group specifically known to have worse glaucoma outcomes than other ethnic groups. Our study also identified two groups at risk of having poorer outcomes amongst our population: patients of male gender and those living in rural areas. This study serves as a baseline and source of comparison for further glaucoma QoL research in Jamaica and the Caribbean.
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REFERENCES


