Reviewer’s report

Title: A Prospective, Longitudinal, Observational Cohort Study Examining How Glaucoma Affects Quality of Life and Visually-Related Function Over 4 Years: Design and Methodology

Version: 2 Date: 5 June 2015

Reviewer: Suzanne van Landingham

Reviewer’s report:

Overall, this study represents a promising effort to clarify the relationship between glaucoma-related vision loss, function, and quality of life. The longitudinal nature of the study is a particular strength. This paper is, overall, well-written. Below are specific comments:

- Discretionary Revisions:

  Background, third paragraph. Several relevant studies examining glaucoma, quality of life, and function are not referenced in this paper and probably should be, either here or in the discussion section.

  Methods/Design, research instruments, paragraph 4, line 126. Reference 29 should be sited here. In that reference, you explain that the test is intended to be useable on any relatively normal computer used with decent lighting. Are lighting conditions standardized in this study? Do all subjects take the test on the same computer? Please also specify lighting conditions (and if they are consistent) for Pelli-Robson contrast sensitivity testing.

  Methods/Design, Statistical analysis: Overall, this section could be less detailed. I expect that most of the audience for this paper will be physicians and some of this section is too technical for that audience. Some of the details can be saved for later publications (it will be easier to understand when it is explained alongside a presentation of the results).

  Methods/Design, Statistical analysis, first paragraph: Given that the stated goal of the study is to examine vision-related function and quality of life over time, I would not consider ‘clinical measures of vision’ a primary outcome variable. I would describe these measures as ‘primary exposure/demographic variables’.

  Methods/Design, Statistical analysis, second paragraph: line 176. I think you mean “all pairs of outcome variables and demographic variables.”

  Methods/Design, Statistical analysis, third paragraph: consider using a latent trait model (i.e. Rasch analysis) to analyze questionnaire data. This could be useful especially as the questionnaire items are not weighted.

  Methods/Design, Missing data paragraph: the last sentence is confusing. What do you mean by a sensitivity analysis?

  Discussion, first paragraph: probably more accurate to say “the overall health and well being of my patients”
Discussion, second paragraph: probably more accurate to say “cognitive decline or other physical ailments in addition to their visual impairment.”

Discussion, third paragraph: probably more accurate to say “VRQoL is an elusive term, the meaning of which may…”

- Minor Essential Revisions:

  Background, second paragraph, line 59. Change ‘their’ to ‘a’ unless you have a specific reference.

  Methods/Design, participants, paragraph 6, line 102. Delete “general”.

  Methods/Design, research instruments, last paragraph, line 162. Delete comma after “in addition to”

  Methods/Design, Statistical analysis, fifth paragraph: clause from line 200-201 (an extension of GCMM…) is missing a verb.

  Table 2, item 3: delete the comma after “one character in each sign”

  Table 3: the line spacing of this questionnaire is awkward and makes it harder to read. Also, the columns are strangely distributed across two pages – this won’t be an issue for the HTML version, I suppose, but the table should either fit in one page or read like normal text (follow the first column to the end of the page, then read the second column, then turn the page, etc). A question mark is needed at the end of item 10. In Part 2, “Next Questions” should be lower case.

- Major Compulsory Revisions:

  Methods/Design, Statistical analysis, sixth paragraph: It is not clear to me how the sample size of 161 was determined to be sufficient. Is this the total number that could be recruited during a particular time period? I am surprised that there is no sample size formula (even an approximation) that can be used with GCMM. Similarly, I am confused by the sentence “for illustration, we estimated precision for class sizes of 20, 60, and 100)- what do you mean by precision and how does this tie into your sample size calculation? What were your results for these precision calculations?

  Table 1: The last two bullets are somewhat vague and subjective. Precise reasons for patient exclusion (visually significant cataract, dementia, etc) should be recorded and included in later publications [this is not a revision, rather a comment for the study going forward]

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests