Reviewer's report

Title: Visual impairment and physical and mental health comorbidities in older adults: cross-sectional study of 291,169 patients in primary care.

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Reviewer: Eva Fenwick

Reviewer's report:

Summary
This paper reports on an important issue, namely prevalence and nature of comorbidity associated with vision impairment. It provides novel data from a very large sample of patients and fills a substantial gap in the literature. The paper is largely well-written and easy to follow (although there are several instances where the language could be tightened to improve clarity and reduce ambiguity) and the conclusions are supported by the data. However, there are several points that the authors should consider which may improve the manuscript.

Discretionary Revisions
1. The use of the term ‘older’ to describe the sample in the paper is sometimes misleading as it suggests comparison with something. For e.g. in the first sentence of the discussion “we found that older patients with visual impairment….relative to non-visually impaired controls and that these differences were not accounted for by age…” sounds like you mean older in comparison to younger patients, rather than simply patients in the UK aged >65 years. Consider just describing it exactly, ‘patients aged greater than 65 years with VI…”

2. The structure of the Discussion section is unusual. Most scientific papers present a summary of main findings; compare and contrast with other related work; offer plausible reasons for differences in findings; discuss the implications of the findings for researchers/clinicians etc; and then discuss the strengths and limitations. It may facilitate readers if the current discussion was presented in a more usual manner.

3. Indicate in table 3 and 4 that the conditions are ordered by size of odds ratio (largest to smallest).

Minor Essential Revisions
1. The title should not include the sample size, and could be more specific, e.g. “Vision impairment is associated with physical and mental comorbidities in older adults: a cross-sectional study.

2. The abstract should include the statistical methods used.

3. The phrase ‘higher levels of multiple comorbidities’ is often used, seemingly to simply mean ‘multiple comorbidities’ or ‘more comorbidities’. The term ‘higher levels’ suggests severity of conditions and that is not what is analysed in this
study. The language should be tightened to say exactly what is meant.

4. The second sentence in the Principle findings of the discussion, “Indeed…” has not been previously reported and belongs as a main findings in the results. A summary of this finding belongs here (i.e. no data).

5. The first sentence in the ‘strengths and weaknesses in relation to other studies’ section is unclear. Need to remove ‘which examine multiple rather than singular comorbidities’?

6. Future research could include a need for cohort studies to enable causality to be explored as we are limited by cross-sectional data here.

Major Compulsory Revisions

1. More information should be given in the methods to describe the definition of visual impairment. Looking at the appendix of the read codes, it seems that the cut-off applied was ‘moderate VI in one eye, no VI in the other’. What categories were excluded? What does ‘moderate’ mean in terms of Logmar or Snellen? It would seem that this paper looks at moderate to severe VI, not mild levels. This should be made clear in the title, abstract and main text. It should also be mentioned in the discussion as a limitation.

2. More information on the exact statistical analyses/modeling used should be provided in the methods, for both the univariate and multivariate analyses. It is unclear if age was adjusted for using the categorical grouping or as a continuous variable.

3. Findings that are significant at the 0.05 level should be indicated in the tables and p values provided.

4. The first sentence in the results section ‘comorbidities: visual impairment vs. controls’ adds up data from rows in table 2, but we do not know if this is statistically significant. The same applies for the last sentence in this section.

5. Also, it seems from table 2 that people with vision impairment are less likely than controls to have 1 or 2 comorbidities, that there is no difference with 3 comorbidities, and those with vision impairment are more likely to have 4 or 5 or more comorbidities. This should be explained and it maybe does not justify adding them all together to simply say ‘those with VI were more likely to be comorbid than controls’.

6. The second sentence in this section does not make sense: “Differences between...were more pronounced...” More pronounced that what? Tighten this sentence.

7. Why weren’t more confounding variables controlled for that could impact on prevalence and number of comborditiies (e.g. marital status, other measures of SES such as income, occupation, education etc? This should be discussed as a limitation. Why were the 3 assessed variables picked?

**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