Reviewer’s report

Title: Prevalence, incidence, and risk factors of primary open-angle glaucoma - a cohort study based on longitudinal data from a German public health insurance

Version: 0 Date: 24 Oct 2018

Reviewer: Ian Murdoch

Reviewer's report:

The authors report an analysis of data taken from the largest health insurance company in Germany. A date of birth restricted sample of 250,000 individuals was taken. Those with 1 or more ACD classification episodes of H:40:1 were identified. Prevalence of this ICD classification was reported for 2010 and incidence from new mentions of the classification during 2011-2013. In both instances reports were collected of single vs 2+ records of the diagnosis. These data are then presented by age with investigation of a variety of risk factors for the diagnosis using regression analysis. The findings are compared to prior literature.

This data is undoubtedly of value however I have some comments on the current presentation:

1 In order to help the reader place the results in context more detail is needed concerning the health insurance and medical practice in Germany. For example:

   * What proportion of the population and demographic base insure with Allgemeine Orstskrankenkasse?
   * Is a diagnostic code recorded for all prevalent disease at every consultation of any speciality?
   * Who records the diagnostic codes…are they simply repeats by a visit to another doctor of separate speciality or is it only an ophthalmologist appointment that makes the entry? In the later case what does this mean in terms of other non-opthalmological diagnoses?
   * Etc

2 Again to help the reader place the findings in context, more detail is required on the use of ICD codes by German doctors. It is more usual in such reports for a wider diagnostic 'catch' to be used which is then filtered by some form of algorhythm with full explanation. One example from the data presented where miss-coding might be present is the surprising proportion of POAG cases with history of past ocular trauma. This might imply some glaucoma secondary to trauma may be miss-allocated to POAG? A sensitivity analysis is reported in a supplementary table I did not see hence this might contain some explanation but I still be lieve more worth putting in the body of the report. Another example that confuses me as a clinician is the diagnosis of 'degeneration of the iris and ciliary body'. This seems a common diagnosis and yet in my own experience is relatively rare hence I must have a miss-understanding. Another example is the rarity of retinal vein occlusions which is somewhat counter-intuitive.

3 More detail of the sample should be given:
* It would be helpful if the sample were compared to the German census data in terms of age, gender, social class and other key variables
* More detail should be given on the method of 'random sample' undertaken.
* What was the denominator population size?

4 Some findings bear more discussion for example lines 374-7 are very brief to address the very interesting finding of the drop-off in prevalence and incidence in the older groups. If the diagnosis is associated with mortality, what was the cause of mortality? Were there specific co-morbidities with the diagnosis? Etc

5 In the results the text simply says all the content of table 1 again. I would far rather see table 1 and have the text simply pick out the salient points. In particular why the estimates (despite being restricted to Caucasian populations) might vary so much. Perhaps putting the previous German estimates in the text into this table might also be of benefit?

6 Some more minor points:

* The only mention if an Afro/Caribbean population is in line 171-3 and no mention is made of ethnic prevalence differences
* I saw no mention of OHTS, EMGT or UKGTS (none of which I am an author on so not self cite!)
* It would be good to include details of the difference between strategy 1 and 2….how many died, how many had the diagnosis changed etc
* The use of smoking related disease as a marker for smoking is open to huge bias and this is not discussed
* The 'lack of dropout' lines 407/8 needs more explanation
* The use of the term validation for the second strategy is slightly misleading. It merely represents a repeat of a prior ICD code. True validation would, to my mind, be an alternative means of case ascertainment for example examination of a sub-sample.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No
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