Reviewer's report

Title: Performance of four computer-coded verbal autopsy methods for cause of death assignment compared with physician coding on 23,000 deaths in low and middle-income countries

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Reviewer: Pam Groenewald

Reviewer's report:

General Comments
1. Given the dearth of death data (both death counts and causes of death) in many LMICs it is important to find tools for recording cause of death data in order to identify health priorities in these countries. This article has the potential to contribute to this process, however, it would benefit from some revisions.

2. In the background it would be useful for the paper to give an indication of how accurate PCVA is in identifying the true underlying cause of death. Clearly there are methodological issues around validation of PCVA against the medical underlying causes but without some understanding of this it seems pointless to compare CCVA against PCVA.

3. Three references in this paper are manuscripts which have been submitted for publication and are presumably under review and thus not available for scrutiny. This is not acceptable. The authors should either hold back publication until after those papers are reviewed or provide adequate information to explain the point with the supporting evidence in this paper.

1. Is the question posed by the authors new and well defined. Some work has been done on this before but it is an area which requires further investigation.

2. Are the methods appropriate and well described and are sufficient details provided to replicate the work? There are limitations to the method, in particular, the lack of a gold standard which needs to be discussed more fully. Also, see specific comments below

3. Are the data sound and well controlled? Difficult to assess until specific comments are addressed.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?

5. Are the discussion and conclusions well balanced and adequately supported by the data? No, see specific comments below

5. Do the title and abstract accurately convey what has been found?
   Yes

6. Is the writing acceptable?
   Apart from the above points yes.
Specific comments (Major compulsory revision)

Methods

1. CCVA methods - it is not clear why the open-source results in Figures 1 and 2 are the same as the PHMRC without HCE results rather than falling somewhere between the PHMRC with and without HCE. It would be useful if the authors could explain or comment.

2. The characteristics of the five VA datasets used in the study are presented in Table 1. It would be important to describe the similarities and differences between these datasets in terms of the data collection (were the same VA questionnaires used, who collected the data etc) as well as the physician coding of the data (quality control measures and procedures followed when physicians disagreed on the cause of death etc).

3. It is not clear whether in the case of the IHME data, the CCVA were compared with the true underlying cause as determined by medical records and diagnostic tests as done in the Flaxman paper or whether it has been compared with the PCVA as done for the other data sets. If compared with the underlying cause determined by medical records and diagnostic tests, it would not be comparable to other approaches.

Results

1. In Table 4 the results of the ORF and OTM are reported as being similar to the IHME tests, however, it is not clear whether the IHME data sample includes or excludes the health care experience (HCE) referred to in the paper by Flaxman et al. and quite different results are reported when HCE is included (37.7 vs 48.0) for adults. Refer to point 2 above.

Discussion

1. In the discussion section mention is made about the high levels of quality control of the physician coding in the datasets used. This should be described in more detail in the methods. Importantly, the discussion should give a clear indication about the validity of the PCVA in terms of the true underlying causes of death.

2. The statements made in the last two sentences of para 2, page 10 need to be explained further as it is not clear what is meant by these statements. In addition, the references are not published and are manuscripts which have been submitted for publication. It is thus not possible to assess the evidence for these statements.

Conclusion

While the possibility of developing an approach that combines the strengths of CCVA and OCVA is suggested, it is not obvious how this would be done. According to the STROBE guideline, it is advised to give a cautious overall interpretation of results considering the objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.
Quality of written English: Acceptable

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??